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The Principles of Management of Tendon Injuries to the Hand

Michael L. Mason, M.D., F.A.C.S.

The repair of tendon injuries to the hand requires the cooperation of surgeon and physical therapist. Without competent physical therapy the surgeon's best work goes to naught and conversely without competent preceding surgery the best efforts of the physical therapist are often to no avail. For each the work calls for patience and care—for the surgeon careful atraumatic precise surgery in procedures often lasting several hours; for the physical therapist prolonged efforts day after day for weeks, often months, with little apparent change from one treatment to the next. For the surgeon as for the physical therapist the treatment does not require expensive instruments and machines but rather the intelligent use of comparatively simple measures and equipment. For each the goal is the same,—the functional restoration of the hand, a conception which must guide the whole course of treatment.

The principles of the surgical management of tendon injuries of the hand are based upon a knowledge of the anatomy, physiology and repair processes of tendon tissue.

A study of the anatomy and repair processes of tendons is an excellent preparation both for the surgeon and physical therapist. Tendon is composed of bundles of parallel white connective fibers bound together by delicate sheaths of areolar tissue. The vascular supply is very scanty, and what blood vessels are present do not penetrate the actual tendon bundles but lie in the connective tissue septa which surround them. Tendon may be divided into two types depending upon the nature of the tissue through which it glides, and this subdivision is of more than theoretical interest. One type of tendon is surrounded by lax areolar tissue which contains a large number of elastic fibers and allows free movement of the tendon. The surrounding tissue, known as paratenon, moves with the tendon, is attached to it and carries blood vessels into it from all sides. The other type of tendon is surrounded by a synovial sheath, the relation of which to tendon may be compared to that of the pleura to the lung. There is a thin smooth membrane covering the tendon directly and closely adherent to its surface. About this is a second membrane with its smooth surface toward the first one, and between the two is a synovial space, within which is a small amount of thin fluid. The two membranes, the outer or parietal and the inner or visceral, are continuous with each other at the ends of the tendon sheath and along one side of the tendon where the sheath is indented to allow for the entrance of blood vessels. This latter portion of the sheath which carries the vessels is known as the mesotenon and may be compared to the mesentery of the small bowel.

In the case of the paratenon covered tendon, blood vessels enter from all sides as well as from the muscle above and the insertion below. In the sheath covered tendons, blood enters from the muscle and insertion, but blood supply along its course is limited to a single thin mesotenon. When we recall that in the fingers the mesotenons are reduced to fine shreds, or vinculae, the slight vascularity of the digital tendons is apparent. We would anticipate that the sheath enclosed tendons would heal more slowly and less surely than the paratenon enclosed ones, and that of the sheath enclosed tendons those on the fingers would heal the poorest.

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The sheath enclosed tendons have greater freedom of movement and when divided retract a considerable distance. The proximal stump of the flexor pollicis longus will retract well up into the wrist and because of its freedom of motion may even turn back on itself. The paratenon enclosed tendons do not have such freedom of movement and do not retract as far as the synovial enclosed tendons. In case of tendon division, search for the stumps of the sheath enclosed tendons must be carried well up into the wrist or forearm, a practice which may entail considerable traumatization and in a contaminated field, wide dissemination of bacteria. The paratenon covered tendons do not separate so far, the ends are more easily found and spontaneous repair may occur under favorable circumstances.

The sheath enclosed tendons and paratenon enclosed tendons behave differently toward infection. Bacteria introduced into a tendon sheath are disseminated throughout the whole space within a short period of time and unless early drainage is secured the poorly vascularized tendon is apt to succumb. Infection about a paratenon covered tendon may remain localized, is not so likely to destroy the entire tendon; and repair may take place even in the presence of slight infection.

The study of the process of tendon repair from a histologic standpoint teaches us certain facts of surgical importance. When a divided tendon is sutured, certain tissues are thrown up which seal the ends together. These tissues, which form the tendon callus, come from the tendon sheath, from the non-specific connective tissues in and about the tendon and from the tendon itself. Most important in the early stage of repair are the sheath tissues which begin to proliferate soon after suture and within a few days have fused the stumps together in a fibroblastic cuff. The connective tissues about the intratendenous vessels also proliferate and send fibroblasts into the space between the divided ends. Thus is produced the first tendon callus which fuses together the divided stumps during the early stages of repair. The blood supply for this new tissue comes from two sources,—the tendon and the surrounding tissues,—and since the tendon blood supply is poor the surrounding tissues are drawn upon very heavily. There results a fusion of the healing tendon with the neighboring structures. The surgeon is at once thrown between the horns of a dilemma since the very process of repair results in adhesions, the greatest enemy to function; while absence of adhesions is inimical to repair. Violent or extensive motion of sutured tendon in the early stage of repair will pull the weakly united stumps apart and disrupt the blood supply. Lack of motion is equally bad since then the adhesions are likely to become firm and can be loosened with difficulty if at all.

Beginning about the fourth day after suture and continuing thereafter at an increasingly rapid pace, the tendon itself begins to take part in the union. At first there is noted only an increase in the number of tendon nuclei and fibers; soon, however, from the ends of the divided stumps tenoblasts push into the space between the ends and, with a small gap, permeate the intervening tissues within ten to fourteen days. From this point on the union becomes tendinous, the sheath tissues become less firm and adherent and take on an areolar character; that is, they revert to their original function of serving as gliding tissue. By the end of the third week following a successful suture the tendon union has become quite firm and in experimental animals has been found to withstand a pull of 30 to 40 pounds before rupturing.

From the standpoint of operative surgery these observations have certain definite applications. While violent and extensive motion of tendons during healing is harmful, gentle motion through a restricted range with the suture line relaxed by proper splinting of the hand is necessary and beneficial. It is therefore advisable to start active motion of the fingers on the second or third post-operative day, while the hand is in the relaxation splint. It is a common observation that active motion of tendons immediately following suture is quite good, but that by the end of the second or third week motion has greatly diminished, and that thereafter return of function is a long slow process. This is a natural phenomenon and expression of the actual process of tendon repair. The sheath and other peritendinous connective tissues are very important in the process of repair and should be disturbed as little as possible in performing suture or graft. It is unwise to strip the tendons from their surrounding tissues for long distances in performing suture. If tendon is removed for use as a graft it should retain a liberal amount of its surrounding tissues.

There should be no foreign material placed between the tendon ends to interfere with their uniting. Sutures should be placed in such a way that the knots do not lie between

the opposed ends and form an obstacle to the growth of tenoblasts into the defect.

The sutured tendons should be splinted in relaxation for about three weeks—that is, until the union has become firm. It is useless to perform a tendon suture and then neglect to put on a splint. The sutures will hold the ends together for but a short time, and a single unguarded motion before union is solid will ruin the whole repair.

The principles of repair of open tendon injury are the same as those which apply to open wounds in general. With proper management open tendon wounds may be repaired provided they can be seen within four hours after they have been received. The open wound demands immediate care. It is the initial treatment which determines subsequent course; good surgery often can modify but never can compensate for the harm which often follows delay in primary care. Immediately after a wound is received it is contaminated with bacteria from without but it is not infected. Infection presupposes bacterial growth, proliferation and the production of toxins. The freshly introduced bacteria, accustomed to conditions in dirt, dust and soil, do not begin immediately to grow and invade the tissues; they require some time to adjust themselves to their new enviromental conditions and for a period of approximately six hours lie dormant, produce no toxins and do not proliferate. During this time of acclimatization the contaminating bacteria may be washed from the wound in much the same way that dirt is washed from the skin and, if the cleansing is carefully done, with slight harm to the tissues. When bacteria were first recognized as the cause of infection, attempts were made to rid wounds of them by means of chemical antiseptics. First carbolic acid was introduced by Lister; then bichloride of mercury, tincture of iodine and nowadays numerous complex and beautifully colored mercurial compounds. However, in this search for an antiseptic that would not irritate delicate tissues, the surgeon often has forgotten that after all what he is trying to do is to promote tissue repair, and that the problem is broader than that of merely destroying bacteria. This struggle to find a harmless antiseptic has served to emphasize the importance of healthy uninjured tissue in the healing of wounds, a lesson taught many years ago by Buchner and Nägeli. The lesson is that antiseptics not only fail to sterilize wounds, but that they damage tissue and delay healing, that injury of any type delays or prevents healing, and that if bacteria can be removed from wounds by any less traumatizing method antiseptics should be discarded.

Primary suture of divided tendons can be performed safely providing we observe the principles of good wound surgery. The patient should be seen within four hours following injury and the wound cleansed gently but thoroughly with soap and water and normal salt solution. Antiseptics should be omitted. Following this cleansing, devitalized tissue should be excised and hemostasis secured. Tendon repair should then be performed with due regard to the nature of the tissue and its susceptibility to trauma. The wound should then be closed and a splint applied to keep the sutured tendons relaxed until strong healing has occurred.

There are certain occasions on which it is inadvisable to perform a primary suture of divided tendons. If the wound is over four hours old but is less than eight hours old we can cleanse and close the wound, but tendon suture is inadvisable. Four hours is the maximum upper limit for primary tendon suture. Tendons have very slight resistance to infection and the presence of even a few organisms, particularly if the tendon has been traumatized by suture, may be enough to lead to an infection. Primary repair should not be undertaken if the surgeon is unfamiliar with the principles and technique of tendon surgery. The possibility of obtaining a good result, particularly in the case of the flexor tendons of the hand, is so slight unless almost ideal conditions obtain, that under such circumstances, even if the wound is seen quite early, it is better judgment to cleanse and close the wound and postpone repair until a later date. Tendon repair should not be undertaken if the facilities for proper surgery are not present. Such facilities should include the proper instruments and suture material, good assistance and the services of an anesthetist. The fine needles and sutures, small hemostats and tissue forceps so necessary for successful tendon repair seldom are found in the emergency room or even in the operating room. To attempt the repair alone under a local anesthetic and in a limited sterile field spells disaster to the patient.

Extensor tendons when they are injured in those parts of their course where they are surrounded by paratenon often will heal spontaneously if splinted in extension even if they are not sutured. It is therefore advisable,

even if suture cannot be accomplished, to splint them for a period of four or five weeks. We have had the occasion to observe a number of cases of dorsal tendon injury in which for various reasons primary suture was not possible. In these instances splints have been applied and relaxation secured until the wound has healed and good functional results have been obtained. The same principle applies to infected wounds on the dorsum of the hand in which tendons have been divided. In one instance of a case of this type there was good functional return following suture of the extensor tendons in which a severe infection prolonged healing for a period of some seven weeks. During this whole time the hand was kept on a splint with the wrist and fingers extended and the infection managed with hot packs, and Dakinization. This principle does not apply to sheath enclosed tendons on the volar surface,—spontaneous repair never occurs and if suture cannot be accomplished there is no evidence that splinting is of any value as far as the tendon itself is concerned.

Rupture of the extensor insertion into the base of the distal phalanx occurs as a typical injury not only in baseball players, whence its name of "base-ball finger," but as a not infrequent injury of every day life. Curiously enough we have seen two instances in which the tendon was ruptured while the patient (one a lady doctor and one a boy) was pulling off a stocking. There is some difference of opinion as to just what constitutes the best type of treatment for this injury. In some instances there occurs an avulsion fracture in which the extensor tendon insertion pulls away the thin shell of cortical bone to which it is attached. In these cases it would seem logical to splint the distal phalanx in hyperextension and thus bring the fracture into position. In instances in which there is actual rupture of the tendon some surgeons believe that splinting in hyperextension for four to six weeks is the treatment of choice, while others are of the opinion that operative repair is indicated. Operation seems logical because of the fact that when the tendon ruptures, the joint capsule also ruptures and bits of tissue from this source fall into the joint cavity. Such bits of tissue, if not removed become adherent within the joint and lead to permanent functional loss. A perfect anatomic and functional result, however, is difficult to obtain by either method.

Secondary tendon repair presents a number of problems, depending upon the nature of the initial tendon injury, the condition of the associated joints and overlying skin, the presence or absence of infection following the initial injury, the particular tendons involved and the time which has elapsed since the injury. All of these factors must be considered in every case and judgment often is difficult. Tendon injury due to a simple laceration presents a much different problem from that offered by loss of tendon from infection. In the case of the simple laceration the tendon ends are in good condition, there is usually a minimum of adhesions about them and they can be isolated and freed and end-to-end suture accomplished. Tendon loss due to infection may be irreparable because of extensive destruction, associated fibrosis and obliteration of the tendon passageways.

The condition of the joints and other tissues may so complicate repair that the tendon replacement may become the least difficult feature of the case. If the joints have become ankylosed it is useless to repair the tendons until motion has been re-established. If the inter-phalangeal joints become fixed by bony ankylosis there is grave doubt of the wisdom of attempting complicated arthroplasties on them. While it is usually possible to re-establish motion in an ankylosed wrist and occasionally in a bony ankylosed metacarpophalangeal joint, the interphalangeal joints seldom regain lost function once actual bony union has taken place. If a fibrous ankylosis is present it may be broken up by physical therapy and tension splinting, or occasionally it may be relieved by operative division of the contracted capsule,—a procedure which often is quite successful on the metacarpophalangeal joints but not so successful in the case of the interphalangeal joints. If the site of injury is overlaid by a dense scar, if because of injury and infection the subcutaneous tissues are absent and the skin thin, scarred and atrophic, tendon repair must be delayed until the scar has been replaced by a skin flap with good subcutaneous fat beneath it. In instances of this type the preparation and transference of the flap is quite a procedure in itself and must be completed before the tendons can be touched.

A wound which has healed by first intention without reaction may be reopened as soon as the tissues have become soft and flexible,—often a matter of but a few weeks. If the original wound was infected, however, repair must be postponed until the wound has been soundly healed for a number of months. The more severe the infection the longer must be

the delay; with mild infections repair may be undertaken six or eight months after all discharge has ceased; with severe infection we must wait twelve to eighteen months. It is this consideration which has strengthened our conviction that unless the primary tendon repair can be accomplished under ideal conditions, the tendons had best be left alone,—the wound simply closed and allowed to heal so that early secondary repair can be performed in a sterile field.

The time which has elapsed since an injury may alter entirely the nature of the operative repair. If many years have passed, the muscles acting upon the divided tendons will have become atrophic and almost functionless, the tendons themselves thin and yellow, and instead of suture or graft we must resort to some sort of tendon transference. Rehabilitation in some cases may be impossible. Where a number of months have elapsed since injury, the muscle, while not functionless, will have retracted a considerable distance and a certain amount of the shortening will be permanent so that it will be found impossible to obtain apposition of the tendon ends. In such instances a tendon graft will be required in order to bridge the gap.

The location of the injury and the particular tendons involved dictate the type of repair procedure. With division of the flexor tendons in the palm and wrist, end-to-end suture or occasionally a short graft is the procedure of choice. In the case of division of the flexor tendons in their course through the fingers the problem is a different one. Experience has shown that the suture of tendons in the osteofibrous tunnels on the fingers rarely is successful, either as a primary or secondary procedure. Where both tendons have been divided and good stumps are present the temptation to use the distal stump for attachment of suture or graft must be resisted. The sutured tendon almost invariably becomes adherent to the walls of the tunnel and function does not return. Such injuries require removal of the entire distal stump and of the digital portion of the proximal stump and replacement by a tendon graft. This graft cannot be sutured to the remnants of the profundus insertion on the distal phalanx but must be led around the base of the phalanx so as to encircle it. The removal of the tendon remnants form the finger usually entails opening of the finger throughout its entire length and the surgeon usually must replace the transverse digital ligaments which hold the tendons against the bone.

SUMMARY

The problem of the repair of tendons of the hand is based upon certain principles dictated by a knowledge of the anatomy and physiology of tendons and the process of tendon repair, and on established principles of wound surgery. In few fields of surgical practice does so much depend upon patience and technique, absolute asepsis, careful handling of tissues, and the avoidance of mechanical or chemical trauma. Neither as a primary nor as a secondary procedure can tendon repair be undertaken hastily and without adequate preparation. Finally without patience and understanding on the part of both surgeon and patient, and without competent and intelligent physical therapy, functional results cannot be obtained.

Educational Value of a Professional Organization

Thirty-five years ago Sir William Osler* spoke on the educational value of the medical society. A well conducted medical society, he maintained, should represent a clearing house in which every local physician would obtain his intellectual rating and in which every physician could determine his assets and liabilities. "We doctors do not 'take stock' often enough," said Osler, "and are very apt to carry on our shelves stale, out-of-date goods. The society helps to keep a man 'up to the times' and enables him to refurnish his mental shop with the latest wares. . . . It keeps his mind open and receptive and counteracts that tendency to premature senility which is apt to overtake the man who lives in a routine."

*Osler, Wm.: On the Educational Value of the Medical Society, Boston M. & S. J. 148:275, 1903.
From the J. A. M. A., Vol. 110, No. 19, May 7, 1938.

The New Building for the Adelaide Tichenor Clinic in Long Beach, California

Gladdes B. Neff

The beautiful new building housing the Adelaide Tichenor Orthopedic Clinic is completed. Trustees, directors, and the staff, proud and happy, escorted some 1500 visitors through the structure on the opening day—January 29, 1938. Now the city of Long Beach at large is better acquainted with the general nature of the work the clinic is performing for the handicapped children of the community.

The Clinic was established eleven years ago through the benevolence of Mrs. Adelaide Tichenor who was impressed with the aid which a well established clinic would give the many children suffering from structural deficiencies. Accordingly, she caused to be inserted in her will the provision that has made possible this clinic for treatment of orthopedic cases.

As one approaches the building one is impressed with the beauty of exterior design. It is of a modern type of architecture with simple straight lines and is designed to provide the maximum of air and light. The building is one story in height, of cream colored stucco, erected at the corner of Wilton and Termino streets. It is placed on a spacious site which has been artistically landscaped to set off to best advantage the beauty of the structure.

As the institution enters its new building it records a total of 1650 cases having come under its treatment in eleven years. Many of these are discharged as having had the maximum amount of treatment necessary for sound citizenry.

A fine balance between the aesthetic and the practical characterizes the interior. A study of many outstanding clinics was made before this one was evolved, and the best features of many have been used.

The predominant color scheme of the interior is cream and desert tan. Entering an attractive reception room furnished in raffia with golden draperies, one is impressed with its spaciousness. To the right is the business office where patients are entered and checked out. To the left is a children's library of striking design and ornamentation. A colorful frieze around the top of this room delights the little patients with the many doings of "Little Black Sambo." This was done by a Long Beach High School girl who deserves great credit. Beyond the library is a suite of rooms for the technicians, consisting of a kitchen which is equipped with an electric refrigerator and range, a very attractive lounging room

and dinette in blue and maize decoration, and a dressing room done in flesh colored tile with individual showers, dressing table, and lockers.

On the left side of the main entrance hall is the hydrotherapy department where the pool is a delight to the eye. Visitors invariably utter many an "Oh" and "Ah" as they gaze on the aqua-marine tiled pool with its shimmering waters and chrome-plated fittings. The 20-foot walls are a combination of peach colored tile rising eight feet with cream colored cork tile extending to the ceiling. The ceiling is also of cream colored cork tile. The roof is of a truss construction of patented design; a ventilator extends the full length of the roof to permit free entrance of fresh air with fans at each end to insure perfect air circulation while radiators at each end of the room permit warm or cool air as desired.

The pool itself is of unique design having rounded corners which permit the free circulation of the water, aiding materially in maintaining a low bacteria count in the water.

When a patient is ready for treatment he is wheeled on a two table guerney to a hydraulic hoist which gently lifts up the table top and the patient and slowly swings out over the water, easily lowering the patient into the water. This adaptation of the hydraulic hoist so commonly seen in automobile establishments to this new use is a boon to all persons who are familiar with the noisy and unsightly devices heretofore in general use.

In the pool is a new type of plinth. The slope can be changed and the table moved whenever necessary. There is also a rotatory horizontal walking bar. Alongside the main pool is a small one to be used for salt water treatment. Showers are available for use before and after leaving the pool.

Across the hall from the hydrotherapy department is the corrective gymnasium where the cream and desert tan coloring is carried out with green trimmings. Individual and group corrective exercises will be given in this spacious and colorful room. Going from the gymnasium are booths to be used for electrotherapy, baking, massage and muscle training. These booths are used as examining rooms by the doctors on clinic days.

Exclusive of the site, the new structure represents an outlay of some $65,000. Equipped as this clinic is, it is ready now to serve an ever-widening circle of patients. The fact that the community at large is becoming more and more aware of the benefit which emanates from this institution will in itself cause many to come or be sent here for aid. Responsible people also will not overlook the important fact that additional endowment means additional service. As a peeble cast into a pool creates waves that travel in ever widening circles until they touch the farthest shores, so gifts made in loving-kindness will pass service to ever-increasing numbers of children who can through the ministrations of the Adelaide Tichenor Clinic become sounder, healthier and happier members of this community.

Swimming at Spalding

Victoria B. Vacha

The large swimming pool at the Spalding School in Chicago was built as a result of the early recognition of the value of underwater treatments in the rehabilitation of certain crippling diseases, primarily, infantile paralysis. Since its completion in 1928 the pool has served a double purpose; the first of these is underwater exercises, and the second is recreational swimming, both of which are given upon doctors' prescription.

The term recreational swimming is probably misleading. Swimming is recreational for the children but to the physical therapists who have had charge of the work since its inception, swimming has been considered as an adjunct to regular physical therapy treatments wherever this is possible, rather than as a purely recreational activity. Swimming is

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not necessarily an end in itself, but rather a means to an end; to be a valid part of a program for physically handicapped children, it must aid in rehabilitation whenever possible, as well as contribute to general physical and mental well being. The general physiological and mental benefits derived from aquatic activities are too well known to call for recapitulation.

True, swimming is recreational, but it is also re-educational. To the average visitor the Spalding pool is a place of miracles. Crutches and braces are cast off, wheel chairs are forgotten, and bodies and limbs which were restrained and hampered enjoy a freedom unknown in any other medium. But--this self same freedom which is a joy to the youngsters and a source of wonder to the average onlooker, is a problem, a source of anxiety, constant study and vigilance on the part of the physical therapist swimming teacher.

The teaching of swimming to handicapped children should never be attempted without basic training in physical therapy. Doctor Lowman in his excellent book, "Technique of Underwater Gymnastics," said, "Teachers of aquatic activities should guard against therapeutic responsibilities beyond the limits of their training." In addition to physical therapy training the teacher should have a thorough knowledge of the technique and methods of teaching swimming, the physics of water activities, and the complete mastery of the kinesiology of swimming strokes. Three years ago the writer took some of the swimming strokes and analyzed them according to the joint motion and the muscles involved. The kinesiology of the strokes was worked out on the basis of anatomy first: To check this anatomical description of the strokes, a muscle examination technique was devised to attempt to set up a functional description. Briefly, it is interesting to note that the anatomical analysis was inferior to the functional analysis of the strokes.

During the current semester 300 boys and girls are registered in recreational swimming classes. Class segregation is made on the basis of grade and sex and includes from the beginning first grade through the eighth grade. Recreational swimming is permitted only when this activity has been prescribed by the child's doctor. The forenoon in the pool is devoted to underwater treatments and the afternoon to swimming. The classes have one twenty-minute period each week, which is the time actually spent in the water, and individuals may have as many as three periods per week if this amount of activity is recommended. The temperature of the water ranges between 88 and 92 degrees. Insofar as orthopedic diagnoses are concerned, classes are of a necessity mixed. The following diagnoses are represented in the entire enrollment:

Infantile Paralysis.
Spastic Paralysis.
Osteomyelitis (healed).
Tuberculosis of Bone (healed).
Congenital Deformities.
Post Traumatic Cases.
Post Operative Cases.
Amputations.
Arthritis.
Postural Defects.
Fractures.
Brachial Paralysis.

Generally speaking, each of the foregoing groups presents broad problems, basic cautions which must be observed, and constant vigilance to prevent indulgence in aquatic activities which are taboo for the group. Generalizations may be made but teaching swimming to handicapped children begins and ends with the individual child. Diagnoses may be grouped but resultant handicaps cannot be. As a result each presents an individual problem to be solved not only in the light of his physical handicap, but also in regard to his emotional reaction to aquatic activities and his behavior—or rather, to his total personality.

In the following discussion the cases presented are not to be considered as typical, nor is it to be presumed that swimming alone was responsible for physical improvements that were made. They are to be considered as examples of how specific problems were solved. The swimming strokes at Spalding are tailor-made to fit individual needs and handicaps. Emphasis must be placed on individual needs; exercises and activities which may be of lasting benefit to one case may do irreparable damage to another. This is especially true in dealing with patients who have been afflicted by infantile paralysis, and in these cases recommendations for swimming are made by orthopedic surgeons only when they are reasonably sure that properly supervised swimming activities would be beneficial to the patient.

Esther was stricken with poliomyelitis at the age of eighteen months. She entered Spalding School at age six in the first grade and started swimming at seven while in be-

ginning second grade. During that first year she had the usual routine physical therapy treatment. At the beginning of her second year in school she was allowed to swim. The picture she presentd was as follows: both legs were flail and she wore crutches and long braces, the hip flexors and abductors were fair plus, the extensors were poor plus, the outward rotators poor plus, inward rotators poor, and the adductors were poor. Both ankles had been arthrodesed so that movement there was eliminated. The knee flexors were fair and the knee extensors were poor. In starting the swimming, Esther was taught the routine procedure of face float, back float, return to stand from both positions. Then she was placed in a tube (rubber ring) and as far as possible all the movements and exercises which had been an intrinsic part of her underwater treatment were utilized and arranged in a sequence which resembled the kick of the simple back stroke.

With her upper trunk supported by the rubber tube her hips and knees were flexed simultaneously. Following this movement she abducted and extended her hips, with her hands on her thighs. During this process of abduction and extension of hip and knee, her hands assisted the movement. Then from this position of extension and abduction her legs were adducted and hands again assisted the movement.

During the development of this so-called swimming stroke each step was carefully checked to be sure that muscles that were already strong were given the minimum of activity, and that the weaker stretched groups were given the maximum of assisted exercise.

When the leg movements were learned to the point of being habitual and the number of false movements decreased, the arm stroke was developed to coincide with the leg stroke, still allowing for assisted movements. As a part of the swimming program for Esther, special water exercises were developed to keep the back and abdominal muscles strong. Using this same technique, the crawl and back crawl were modified to fit her case. At the present writing her hip flexors and abductors are good, extensors fair plus, outward rotators fair, inward rotators poor plus, adductors fair, knee flexors good, knee extensors fair. The musculature of the calf has good tone and atrophy is considerably decreased. Her trunk and abdominal muscles are normal. She swims three times a week.

The second largest group which is to be found in the swimming classes consists of the so-called "spastics." Generally speaking, these may be divided into two groups—the hemiplegias and the quadraplegias. The methods of teaching swimming to both groups varies. The hemiplegias for the purposes of swimming have normal arm and leg by which activity may be gauged. The great difficulty that is usually encountered in teaching a hemiplegia to swim, is that the normal arm and leg will go ahead and set a pace that cannot be kept by the paralyzed side, rendering that side static, thus increasing the spasticity and tensity.

Nora entered school at the age of six in the first grade and presented a typical picture of a right hemiplegia. She was given table treatment and at the same time her doctor granted her permission to take swimming. She walked with a raised heel, slightly flexed hip and knee. Her arm was stiff and her fist was clenched.

After the preliminaries of getting used to the water, Nora was put into a tube and work on her back stroke was started. In this case two strokes were started simultaneously—the simple back stroke and the back crawl. The kick was started on the paralyzed side and active assistance was given until she could coordinate the movement slowly, the beat and timing of the kick being determined by the paralyzed leg. The "loose leg" as she called her good leg was the model for motion.

After the legs were started, the arm motion was begun and the same rule was observed. All of this work with Nora was done slowly; the entire first year in swimming classes was spent in a tube. Swimming as such may be an end for the children but not for the teacher. Progress is made slowly and cautiously.

In working with the arms the following has been quite successful in some cases and was used with Nora. In starting the arm motion for simple back stroke she was permitted to take hold of the right hand with her left one (the normal side) and pull it to a position of complete extension overhead. From this position the arms were allowed to float down to the sides, to prevent over-development of strong shoulder adductors. The support provided by the tube prevented too much ducking and shipping of water. In addition to teaching the simple back stroke arms, a reverse back stroke was taught, with accent laid on abduction.

With these cases stress is placed on coordination, control and slow motion. (At present

Nora is able to swim the simple back stroke, crawl, and the back crawl, which is still being worked on.) She walks with rhythmic gait, her heel is down and hip and knee are extended. Her arm is carried almost normally except that the tendency to carry her elbow slightly flexed persists. She is in the third grade at the present time and swims and dives with ease.

The approach to teaching a quadriplegia to swim differs from that of teaching a hemiplegia to swim. The steps vary with the individual, and the basic problems are extremely varied.

Marvin entered Spalding at the age of four in the nursery. He started swimming eighteen months ago at the age of six. He is a spastic quadriplegia, does not walk, has contractures of the hips and knees, typical spasticity of his arms, and no speech involvement. In addition to the physical handicap the child labored under the handicap of emotional imbalance and personality maladjustment. His mental outlook was just as spastic as his physical being.

The first six months in the pool were spent in developing a sense of security in the child and in overcoming his abnormal fear of falling. Any attempt to work with him from the physical therapy point of view was wasted effort because of the emotional block. A regular period in the pool was useless and because of his fear he had to be held constantly. He was absolutely unable to do anything. After being taken into the pool off and on for a period of six months, alone and with a group, he began to manifest an interest in the play and activity of other children. Then the work with Marvin was begun.

He was taught to lie still in a tube. Then he did what the children call butterfly floating or star fish floating, which is simultaneous abduction and adduction of the arms and legs. No force is used in either movement since the children try to move their limbs without disturbing the surface of the water.

In addition to this swimming activity he was encouraged to enter into the games of the rest of the group. He made his first solo attempts at standing and walking in the swimming pool. Since he is under the writer's care for physical therapy treatments, these and his work in the pool have been closely coordinated. He is still swimming in a tube but his movements are controlled and well coordinated. His hips and knees have been straightened and in December 1937, at the age of seven and a half, he walked alone for the first time. His progress in the pool is slow and will be slow since it is preferable that way.

Children who are afflicted with cerebral palsy may do excellent work in the swimming pool if sufficient time is allowed to adjust emotional and personality problems when they are manifested.

In time Marvin will swim, as well as walk, and swimming should contribute to the entire physical picture. On the contrary, an ambulatory spastic quadriplegia, age eleven at the time of entrance to Spalding in September 1935, demonstrated his swimming ability the first time he entered the pool. His swimming was a detriment and added to his physical handicap. He had learned to swim at a summer camp and was permitted to swim at the lake during the summer without intelligent guidance and supervision. As a result he swam a jerky crawl and a hitching side stroke with the idea that speed was the thing. The process of trying to break old habits and motor patterns and building new ones has been unpleasant to him and a trial to the teacher. During the past semester he has finally learned to do a slow, controlled, well-coordinated, simple back stroke, and his crawl is beginning to show signs of training. It is interesting to conjecture what his physical condition might have been if treatment and supervision had been consistent and carried over into all of his physical activities.

When healed tuberculosis of the bone and osteomyelitis cases are referred to the swimming pool, the general routine of swimming and aquatic activities are given. The children come in with restrictions as to activity in the pool, such as no jumping and diving; this is especially true of Potts' disease cases. They are taught simple back stroke, crawl and back crawl. The advisability of teaching the side stroke which is an asymetrical stroke in orthopedic cases is still questionable in the writer's mind. Children who have had osteomyelitis gain in general muscle tone and in a sense of physical well being.

In cases of tuberculosis of the hip joint, where the joint is ankylosed, any swimming stroke except side stroke is taught. Children with ankylosed hip and knee joints learn to compensate for the stiff joint; for instance, William was permitted to take swimming in September 1935, after he had spent seven years in and out of a cast. He has a right stiff hip and three inches of shortening. In

spite of the stiff hip he has learned to do an excellent crawl and back crawl with the drive in these strokes developing at the knee. In the simple back stroke kick which normally calls for flexion, outward rotation, abduction, and forcible adduction at the hip, any adaptation which fits the case is used.

In the cases of Potts' disease all of the symmetrical strokes are taught; variations in accent and body positions are altered to allow fullest development of the back and general trunk muscles.

In post traumatic and post operative cases variations again are made to fit the individual needs. Irwin entered Spalding at the age of seven with a 35 degree contracture of his right knee, the result of a third degree burn. In addition to his regular physical therapy treatment he was given orders for swimming. As an extension of his regular treatment all of his activities in the pool were planned to aid in overcoming the contractures. Progress was hindered by severe contractures but after surgical intervention the work was continued. The first stroke he was taught after the preliminary routine was the back crawl. This was in a tube and the accent of the kick was placed on a forcible extension of the knee. A kick of this type gave him active extension and reverse kick used in the front crawl afforded a certain amount of passive stretching due to the resistance of the water; the accent in this case was placed on forcible extension of the leg from the hip. He is able to swim both front and back crawl and the contracture of his knee has been reduced to 10 degrees.

Cases of amputations and congenital deformities are very interesting and often present difficult problems of balance and coordination. The most interesting problem at Spalding is a girl, Frances, who entered at the age of six, with congenital lack of both legs, the right one off just above the knee and the left off below the knee. In addition her left arm was off just below the elbow. Her right arm was her only complete appendage. She walked exceedingly well on a pair of artificial legs and was capable of dressing herself, but in the swimming pool she presented another problem. Since she was minus her artificial legs she was too short to touch the bottom of the pool at the shallow end, and so had to be kept in a tube constantly. She was taught to float on her face and on her back. In the front crawl every time she raised her head to breathe she went to the bottom of the pool like a plummet. In the back crawl when her hips were flexed she sank. The key to the entire problem lay in the control of head positions, but finding a satisfactory position was difficult. The body roll which accompanies breathing in a normal stroke was almost impossible because there was only one arm to work with, and in order to swim any distance Frances had to breathe. Her determination and cheerful acceptance of constant ducking has made it possible for her to swim. At the end of a year and a half she is able to swim the length of the pool, a distance of forty-two feet. The problem finally was solved by having her turn to her right side and take two strokes with right arm while she breathes over her left shoulder.

By way of contrast to the preceding case Tom entered Spalding at the age of twelve with an amputation of his left arm just below the shoulder joint and his left leg just below the knee as the result of an untimely meeting with a twelve-ton truck. After the stumps had healed Tom was allowed to go swimming. The interesting feature in this case was that he could swim before the accident. The first time he went into the pool he floundered and was off balance. He worked in a tube for a few weeks, the problem of balance and compensation for the shortened limbs was worked out and Tom was able to swim.

Oftentimes arthritic patients are sent to the pool with orders to increase motion in a joint. James entered Spalding at the age of twelve with no motion in his right knee as the result of a suppurative arthritis. The work in the pool complemented his table treatments. The kicks of the back crawl and front crawl we retaught with the accent on a knee drive instead of a hip drive. He is a natural in the back crawl and does the stroke beautifully. He has 45 degree motion in his knee at present.

In simple postural cases, deviations in the anterior posterior plane, much benefit can be derived from swimming strokes if they are properly planned to give the maximum of correction. The caution to be observed is that the child does the stroke as it is supposed to be done and not the way he would like to do it. In round shoulders the back stroke and back crawl may be used. In simple back stroke the accent is placed on over-abduction in the opening movement and on extreme adduction to the point of adducting the scapula on the close. Adduction of the scapula can be induced by having the child attempt to touch finger tips behind his back on the closing movement, rather than by stopping at the

sides as is done in the standard stroke. Swimming on the back is an excellent aid in treating lordosis. The crawl has been an excellent aid in treating all of these cases.

The writer has avoided the use of the breast stroke as an aid to the correction of round shoulders and round back although its use has been recommended. The tendency to shorten and strengthen tight pectorals is too great. It has been suggested that the area be maintained in a position of outward rotation and the hands in supination be maintained to overcome strong pectoral action. In actual practice the pectorals maintain their strong pull. The coordination and alterations needed to make the breast stroke even partially corrective are too difficult and uninteresting for the average child.

Recommendations have also been made regarding the use of side stroke as a means of correction in lateral curvature. The position in a side stroke is not sufficient to warrant its use as an aid to correction. In cases of this type the writer uses symmetrical strokes, particularly the front crawl, for the purpose of developing general musculature in cases where it is advised by a physician. Back cases recommended to the pool at Spalding are in the greater part those that have had surgical intervention and the spine is fused or casts have been used to induce compensation. In cases of this type every exercise is designed to aid the back in holding the position which is deemed to be best suited for it.

In addition to the regular swimming, an aquatic program is conducted which more or less resembles the activities found in any pool. The children pass tests which are adapted to meet the abilities and disabilities of the individual child. These tests are carefully recorded and represent the child's personal achievement as well as his ability to demonstrate proficiency in those activities which were modified to suit his needs. Land games of all types are adapted to water play. Specially created stunts satisfy the urge for individual accomplishment and the satisfaction which accompanies a feeling of success.

Classes are held annually in American Red Cross life saving. The children who eventually pass the life saving tests are held to the same requirements as physically normal children. It is interesting to note that the number of children who enter the class greatly exceeds the total number who pass the final tests. Many children by virtue of their handicaps are actually eliminated from the final test before they start, but they are permitted to take the entire course with that understanding. In the end they may not be able to proficiently demonstrate all of the techniques of life saving but they will have a sound course and basic training and as a result an appreciation of the value of safety first in the water.

During the past ten years the Spalding school has offered to all children permitted to partake of it, a well rounded program of aquatic activities under the guidance and supervision of a physical therapist swimming teacher. An honest and sincere attempt has been made to make swimming and allied aquatic activities valid contributors to the program for the rehabilitation of the handicapped child. The attitude of the Spalding school has been searching, open, subject to change when alterations are indicated, experimental, and one of constant study in order to make a real contribution to the children, not only from the standpoint of the immediate and future needs of their physical disability, but also as a contributing factor to their mental growth and social and emotional development.

Physical Therapy in Arthroplasty

Max. A. Levine

One of the most delicate problems a physical therapist has to deal with is that of the proper management of a newly or recently mobilized joint. The factors which make such a joint so difficult to treat resolve themselves into the following: (1) Muscles which have been dormant are now called upon for coordinated motions. (2) Associated pains follow any major operative procedure. (3) The handling of a transplant, such as a fascia, so that its mobility will not be too greatly disturbed. (4) The last and major factor is that of the danger through enforced post-operative immobilization of losing the very benefits gained by movement, for which the operation was intended. The success or failure of any reconstruction is as dependent on the post-operative care as on the operative procedure. The physical therapist plays an essential role in the proper and intelligent post-operative care.

Names or descriptions of arthroplasty procedures purposely have been omitted as this paper is intended merely to enlighten the physical therapist on the hazards and pitfalls encountered in the early after-care of a newly mobilized joint regardless of what operative technic is followed. This, however, does not mean that the physical therapist should be unfamiliar with the operative procedure which was done in the particular patient to be treated. Obviously, where the fixation of recently incised bone or soft tissue is held together with absorbable sutures, et cetera, assisted passive motion must be guarded. The extent of the fascial covering and adequacy of joint space all must be considered.

The aim in the after-treatment of mobilized joints is the very gradual return of motion. The hazards associated with haste in the mobilization process are very definite. The reasons for these are: (1) Each newly formed joint has a free transplant, such as fascia lata, which in itself must become revascularized by direct capillary anastomosis; therefore, any attempt at too forceful or too early manipulation, such as passive or assisted active motion, would dishearten the blood supply to the transplant and a slough might follow. Also, the free transplant should not be subjected to extremes of temperature in the early after-care with hydro- and heliotherapy. Such extremes have a marked tendency to irritate or even coagulate the new tissue which in turn acts as a foreign body and suppuration ensues with resultant failure of the arthroplasty. (2) Conversely, delay in initiating motion defeats the very purpose of the operation by allowing fixation by fibrosis and secondary bone formation. In addition, education of the reconstructed joint must be in the direction of function and must avoid fixation in poor positions. The factors of muscle reeducation after arthroplasty is similar to any encountered in any rehabilitation process regardless of whether the etiology is paralytic or post-fracture. Here, where the muscle spasm is due to joint friction and intra-articular pressure, underwater exercise in large baths or pools should be instituted. The water should be approximately 90 F. and may be fresh or salt; the latter may aid in the bouyancy and thus lessen the load of gravity and at the same time reduce, to a great extent, the muscle spasm. The restoration must be gradual but perseverant, and only after such deliberation can we expect to gain any satisfactory ground.

To illustrate the practical application of these principles we can proceed to briefly consider the post-operative care of arthroplasties of the various joints.

The temporomandibular joints, although not the most successful of all arthroplasties, is the most important and, therefore, is discussed first. This newly reconstructed joint is kept at rest for two weeks, and then should receive assisted active to gentle passive motion. Gentle massage about the masseter muscles is carried out. Gradually more forceful stretching may be accomplished manually or with the aid of a wedge screw. One must avoid rotation of the mandible as this motion will have a tendency to produce a painful joint. Rotation should be the last movement attempted, as its early introduction may induce pain and instability. Active motion of this joint will not be neglected by the patient if adequate excursion is present.

The next joint, that of the elbow, has the

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most favorable outlook. The mobilization of this joint is relatively without much difficulty; however, here also, in addition to the regular rules to successful arthroplasty, there are several cautions which must be observed. The elbow is kept immobilized for two to three weeks. At first, only assisted active motion is carried out. After five to six weeks passive motion is begun. Massage is started about the fourth week. Not until four to six weeks have elapsed post-operatively should any hydrotherapy or heat be employed. To reiterate, not infrequently, exercises are done too early under hot or even warm water, and as a result the transplanted interposed tissue loses its viability and drainage and slough follows. A secondary ankylosis may be the sequellae.

The knee joint, too, is kept splinted, with or without traction, for two to three weeks, and the mobilization here also is gradual. The splint is replaced by a movable apparatus, such as a Thomas Ring and Pierson attachment with necessary traction arrangement for passive flexion and extension. Gradually assisted active motion is added. Gentle massage and underwater exercises may be added three to four weeks post-operative but not until six weeks have elapsed should heat or hot baths be used. Muscle training of the quadriceps and hamstrings should be started as early as the fourth to sixth week. Preventions of flexion contractures which so commonly follow arthroplasty of the knee must be guarded against. At the first sign of contracture, the knee is kept in extension with a splint for ten days to two weeks and then physical therapy reapplied. Weight bearing with the aid of crutches may be allowed after six to eight weeks.

Following hip arthroplasty, the traction plaster spica and one-half or double spica is removed in two to three weeks and then passive and assisted active motion is begun with the aid of overhead slings and pulleys so that the patient can abduct, adduct, flex and extend (by gravity) the involved hip. The remainder of the treatment closely parallels that described above for knee arthroplasty. In addition, muscle training is concentrated on the flexor group, in order to obtain good stability of this joint. Also for the first four to six months, the physical therapist must guard against a not infrequent sequellae of hip reconstructions; namely, adduction flexion contractures. Such complications are treated by the usual stretching or even immobilization, corrected or overcorrected positions.

The after-care in arthroplasty of the shoulder, ankle, wrist, and digits of the hand and feet may be modified from the foregoing procedures. These joints are not discussed in detail as they are less frequently encountered.

An American Physical Therapist in England

Marjorie M. Dennen

It was just a year ago Christmas Eve that I sailed for England. My destination was the Wingfield Morris Orthopedic Hospital which was situated a short distance from the center of the College City, Oxford. I looked forward with anticipation not only to the trip, but to the prospect that I was to become a member of a physical therapy staff in England exchanging places with an English masseuse who was on her way to America.

The hospital work was carried on in five large separate buildings—three being designated for wards, one for an operating room and the other for the well equipped physical therapy department and gymnasium. Each ward could be opened during the summer months and the patients were wheeled out into the sunshine where treatments were sometimes given. Provision had been made for a playing field, tennis court and gymnasium where the nurses and staff played hockey, tennis and badminton.

All types of orthopedic cases were treated

Hospital for the Ruptured and Crippled, New York City.

by the six physical therapy technicians. Each technician was assigned to a certain number of patients according to her suitability in treating a particular type of orthopedic disability. If the patient was to be operated on, the technician watched the operation and continued the treatment until the patient was discharged. The value of careful after treatment was especially noticed following a manipulative operation. The author had occasion to see a number of manipulations which were performed under anesthesia to release adhesions and stiffness of chronic conditions of joints. Under the anesthetic it was possible to move the joint in a range of movement beyond normal. The best results from such procedure depended upon the daily administration of physical therapy, the physical therapist attempting to obtain the same degree of joint movement.

Scoliosis was treated by the Risser method of plaster application somewhat modified. A gradual overcorrection of the curve was brought about before a spinal fusion.

The infantile paralysis patients were treated in a pool which was a good model for one that would be used in a small hospital. The bath was twelve feet by eight feet in size with two graduated steps extending the length of the pool. Removable walking bars were used for walking and also for exercising. With this size pool the technician worked efficiently from the outside. The treatment of the paralysis followed closely the methods which are known here.

During my stay in England a visit was made to the Children's Hospital in Bath. Miss M. Forrester Brown, one of the doctors in charge, had traveled extensively in America and Sweden and had correlated many ideas in the work at Bath. The posture work here was based on that of Doctor Goldwaithe in Boston.

On the day of my visit all the children were out in the open. Those who had poliomyelitis and whose trunk muscles were of fair strength were lying in the prone position in anterior plaster shells which extended from the hips to the shoulders. This position was maintained for progressively longer periods each day. Thus the back extensors and gluteii automatically contracted each time the head was raised.

This hospital was fortunate to be near the Roman Baths which were of historical note in the city of Bath as they have an inexhaustible supply of naturally hot water. The baths remain in their original state of stone columns and formations of rock and the pool appears medieval in these surroundings. The temperature of the water ranges from 95 to 100 degrees.

In the gymnasium at the Children's Hospital, a child who has very weak trunk muscles is taught to walk by use of a head suspension arrangement. A Sayre sling is attached to an overhead trolley, well-oiled so that the head sling moves smoothly with the patient as he progresses. In this respect it is desirable to have the patient moving between a pair of parallel bars so that some of the weight can be taken by the arms and any rotary swing avoided. The bars should lead up to a large mirror, thus allowing the patient to observe his progression.

Before leaving England, the writer also visited Middlesex Hospital in London. The posture work done here under the direction of Mr. Philip Wiles, F. R. C. S., brought several points to my attention. This method was based on measurement and correction of the pelvic inclination. New postural reflexes were established by exercises which were given in such a way that the part of the body with poor posture was kept still and the rest of the body was moved. In other words, correction of deformity was not done by movement but by absence of movement. A patient was taught to keep a good posture during every variety of activity.

Some patients were treated in class groups. There were group classes for fractures in various stages of improvement, classes for persons with lower back strain, arthritis, or weak feet. In instances where a clinic is large, this seemed a worthwhile arrangement. The patients enjoyed the classes, attended regularly, and worked diligently.

The physical therapy technicians who carry on the work in the various hospitals are known as masseuses. To become a masseuse one must be a member of the Charter Society of Massage and Medical Gymnastics which means the successful completion of a three-year physical therapy course with examinations in all branches of physical therapy.

The Cruise of the Good Ship "Polio"

Elizabeth W. Thomson

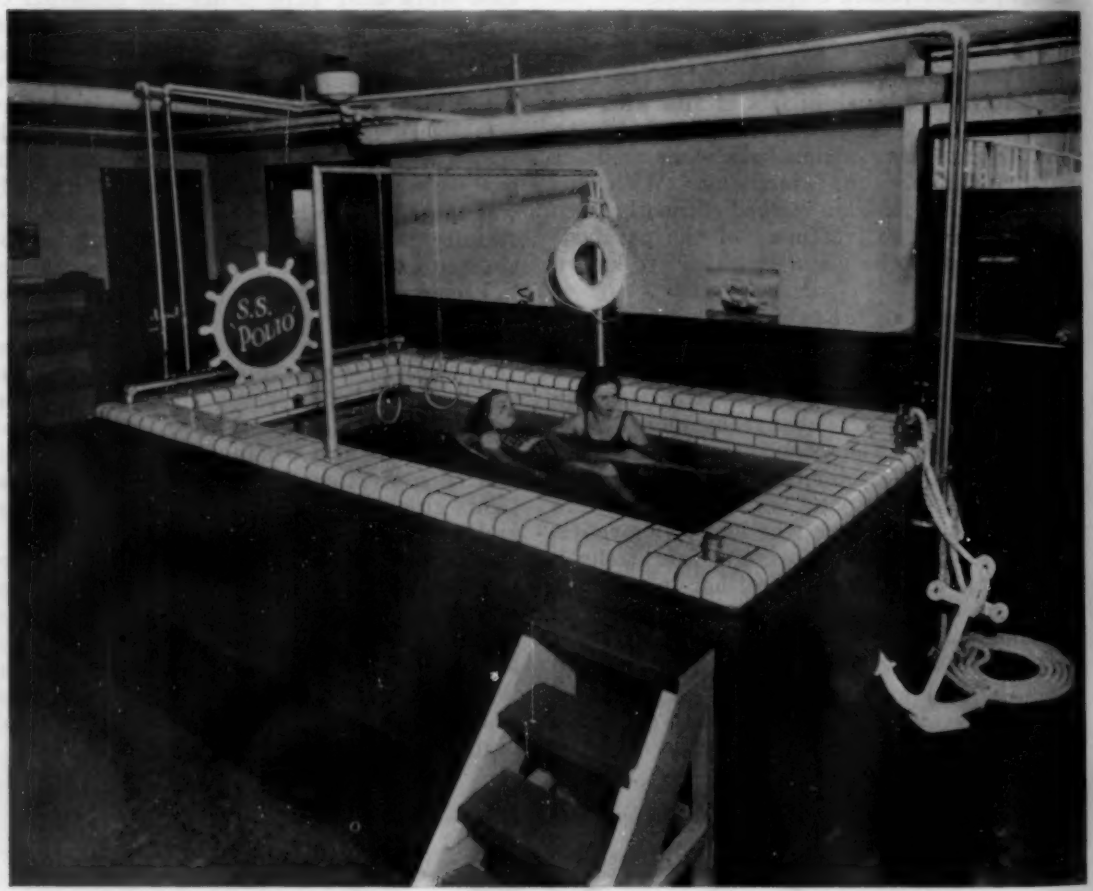
"All ashore who's going ashore!"

The daily cruise of the good ship "Polio," which starts six mornings a week at eight-thirty from the Junior League Home for Crippled Children, Nashville, Tennessee, is about to cast off for the "Physiotherapy Sea."

On board we have the Captain and First Mate, and some eight or ten eager and happy voyagers. These passengers have arrived for the morning "trip" by wheel chair, stretcher or on crutches. All are well equipped with leg, arm or body braces of various sorts. But once on board ship, all this burdensome equipment is temporarily discarded, with the hope always, that one day this discarding will be permanent.

And now, who are these passengers and what is this ship? The Physical Therapy Department of this crippled children's home is the make-believe S. S. Polio. Why "Polio?" Because more than seventy-five per cent of the children who come to this department for treatment have had anterior poliomyelitis, commonly called infantile paralysis. The physical therapist in charge is the Captain, and her assistant, First Mate. The passengers, who thoroughly enjoy their daily cruise, are

Physical Therapy Department, Junior League Home for Crippled Children, Nashville, Tennessee.



the little patients from all sections of Middle Tennessee, who are cared for free of charge in the Junior League Home during their period of convalescence.

The large room, 60x20 feet, emanates a nautical atmosphere the instant one enters. The linoleum-covered floor is a deep sea green. The lower walls up to deck rail height are greenish-blue and the upper walls and ceiling, horizon blue. About the wall, on the horizon line, are colored ship prints. On the wide sills of the eight large windows are fish and turtle aquariums, odd collections of sea shells, ship models and a large white anchor. One enters the good ship "Polio" through the "ship's lounge and Captain's cabin." Here is the Captain's desk, filing cabinets, a chair or two, a couch covered in deep blue and rope-trimmed, and a book-case, holding not only much medical knowledge but gayly colored picture books and games as well. On the walls of this "lounge" are the only photographs in the room. On the center wall, facing the rest of the "ship," is a photograph of President Roosevelt, graciously signed by him and presented to the children with best wishes for a successful voyage. To one side of this picture are snap-shots of former Junior League passengers who have completed their trips; and on another side are pictures of the pools at Warm Springs, Georgia, and a photograph of the first medical director there, Dr. LeRoy Hubbard.

The Junior League Physical Therapy Department keeps in close touch at all times with the work being done at Warm Springs, that the patients in the Home may receive every benefit from new knowledge of modern treatment. This after-treatment of infantile paralysis is given in the small white tiled pool built in one end of the large room. It is ten feet long, five feet wide and may be filled to a depth of three feet. At one end of the pool is fixed a large white pilot wheel with the letters S. S. Polio on a navy background. All visible pipes and metal work are aluminum finish. Hanging from an overhead cross bar are two

swinging rings and on an upright post is a white life preserver. The table on which the children lie, submerged in the warm water, is specially designed and constructed of aluminum sheet and tubing.

We know that muscles, weakened as a result of infantile paralysis, will have a better chance of regaining lost power in such a favorable medium as warm water. Any water will do if it is warmer than skin temperature by two or three degrees. There is no need for unusual chemical properties in the water. The benefit is derived from intelligently worked-out exercises, carefully directed, that are accomplished in water with a minimum of fatigue due to buoyancy which eliminates much body weight. Each affected muscle is exercised, and very gradually, but nearly always, muscle power is gained. With stronger muscles there is improvement in other ways—better body balance, greater ease in walking, and a happier outlook on life.

When the poliomyelitis patient has gained enough to begin to walk outside the water he starts this instruction on the adjustable walking ramp. This piece of equipment occupies a prominent place in the "ship's" gymnasium. Two parallel bars, 20 feet long, are set on upright posts sunk into the floor. At one end of the ramp is a long mirror, and on the floor down the center is a two-inch wide white line. Here the youngster learns principles of balance, good posture, proper placement of feet and spacing of steps. When all this has been accomplished he may graduate to the overhead trolley and harness which will prevent falling while he is learning the best way to handle crutches. After he has learned to walk alone with his crutches and is able to sit down and get up from a chair alone, he is allowed to be a walking patient, instead of a chair patient.

In this same section of the department is a long low table on which are many bright colored objects designed to encourage activity of the hand and wrist muscles. Close by on the wall is a large red and white wheel which, when turned by a child with weakened arm and shoulder muscles, will ring a bell for every revolution. There are also stall bars from floor to ceiling on which to climb to view the "sea."

And finally on the side of the room opposite the pool is the electrotherapy section. Here are the various heat lamps, bakers, the sunlamp and the short wave diathermy. This latter machine makes it possible to generate heat deep within affected joints and tissues, instead of heating the skin surface. With this equipment it is possible also to create artificial fever, so beneficial in some conditions.

By the time the good ship "Polio" ties up to her mooring at four o'clock each afternoon, some eighteen or twenty small passengers have made use of this equipment, with eager hope that some day they may return to their homes stronger and better in every way. And it is the earnest hope of the Captain and First Mate that the daily cruises of the good ship "Polio" will have in some measure aided in the development of more useful and independent citizens.

The Spastic Child in the Classroom

Eleanor V. Givins

From the viewpoint of the teacher, the spastic child probably presents the greatest problem in the schoolroom. He has greater difficulty in conforming to the usual classroom procedure. However, because of the large number of spastics in the schools, they bear special consideration.

Mrs. Hazel C. McIntire, Director of Special Schools in Ohio, reported that in the school year 1935-1936, there were 205 spastic children in public special schools, 16.5 per cent of the total enrollment of 1241.[1] She remarked that the large number (next to infantile paralysis) was due, not to a great increase in such cases, but because there is more interest in this group and they now are receiving a fair chance. Last year, 1936-1937, Charles Feilbach School of Toledo reported

Teacher, Charles Feilbach School, Toledo, Ohio.

28 spastic children, over 14 per cent of our total enrollment.

Doctor Carlson states that there is a wide range of difference in the mental resources of the birth injured—from idiocy to purely motor handicaps with little or no mental disturbance.[2] Tremulous rigidity, violent irrelevant movements, delayed or difficult speech, and drooling have no validity as evidences of mental defect. There is a difference between a feeble mind and a good mind that has been damaged. He contends that we cannot rely too much on intelligence tests as criteria of their mentality, as the majority of tests require the use of muscles over which the child may have little or no control. However, he does believe that the intelligence tests may serve as a starting point and if subsequent tests show higher rating, we know that the child is making progress.[3]

Records of 628 crippled children in Ohio schools for the school year 1936-1937 showed that the median Intelligence Quotient was 89, just one point below the normal I.Q., but the median Intelligence Quotient of spastics only was 82. Last year, the spastic children at Feilbach School had a median Intelligence quotient of 81 as compared with an Intelligence Quotient of 94 for other crippled children, exclusive of spastics. The Intelligence Quotient of a considerable number of these children is such as to justify serious effort at their education.

The methods in the schoolroom must be adapted to help the spastic child. There may be disabilities of speech or hearing or vision which interfere with his schooling and which should receive special consideration. The question of handedness should be investigated.[4] Anxiety, fear and self-consciousness should be reduced as much as possible. He should be comfortable and feel secure in a chair which permits him to put his feet firmly on the floor. His paper could be held in place by thumb tacks. Let him use large arm movements in writing, using paper with lines of more than the usual width. It may be necessary for the teacher or another pupil to write his work for him. He should have time to express himself without being conscious of impatience on the part of the teacher. Whenever possible he should be permitted to perform the same activities as the other children but at a slower rate. Competition with others should be avoided. School work in which the element of time enters tends to overstimulate him and he cannot do his best work.

Behavior and psychiatric problems are present in almost every case, according to Doctor Carlson. The spastic child may use his handicap as a defense mechanism. Inability to cope with nervous overflow reaction may drive him to despair.[5] Unfavorable comparisons tend to deepen a feeling of incompetence and arouse jealousy, resentment, diffidence, or sullenness. Attitudes of pity or contempt towards him are disastrous. Morale can be built up by making requirements simple and thus permitting some degree of success. The level of expected performance should be set at a level challenging his ability but not so high that failure is likely.

Thomas and Rogers claim that the spastic child should be given more rather than less education than the average child because he will need more strength of mind, more courage, and a stronger philosophy of life to be able to hold his own.[6] Spastic children should be considered a group of interesting, soluble problems in education, rather than a dull, pitiful group of dependent cripples.[7]

BIBLIOGRAPHY

1. McIntire, Hazel C.: An Analysis of Crippling Conditions and the Age-Grade Distribution in Orthopedic Classes in Ohio.
2. Carlson, Earl R.: Neurological Aspects and Treatment of Birth Injuries. New York State Jour. of Med., Vol. 34, Oct. 1, 1934, No. 19; p. 831-836.
3. Ibid. p. 831.
4. Ibid. pp. 831-832.
5. Carlson, Earl A.: The Problem of the Spastic Child. The Crippled Child Magazine, August 1935, Vol. XIII, No. 2, p. 58.
6. Thomas, Leah C. and Rogers, G. Gage: The Spastic as a Child. Physiotherapy Review, May-June 1934, p. 60.
7. Crothers, Bronson: Physiological Management of Children Handicapped by Cerebral Palsy." Lecture, June 11, 1929. Published by Visiting Nurse Association of Chicago, 1929.

An Adjustable Splint for Paralysis of the Shoulder and Arm

Fremont A. Chandler, M.D.

Protection of paralyzed muscles during the acute and subacute stage of anterior poliomyelitis is an accepted orthopedic principle. This may be accomplished by the application of casts, splints or other external supports as soon as any muscular involvement is detected.

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Recumbency in bed is essential and should be carried out with the use of a "fracture" board between the springs and mattress of the bed.

A simple, inexpensive, adjustable splint to protect the shoulder and arm is described below:

Three-inch by one-inch boards, of lengths

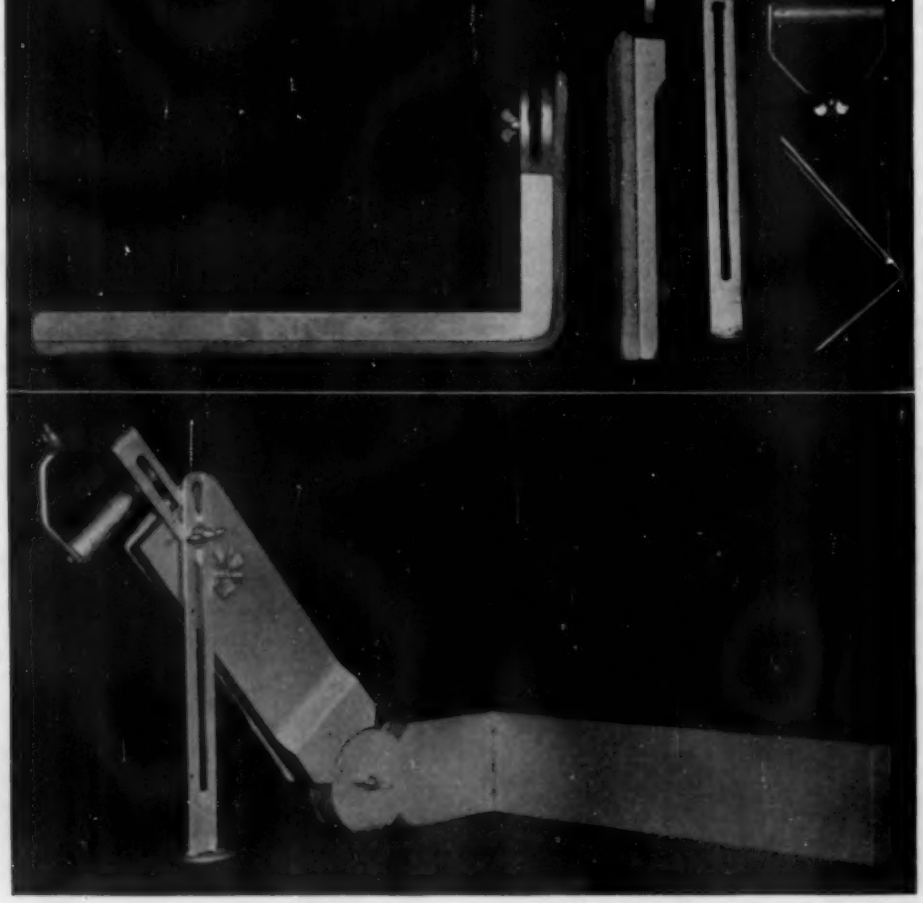

Fig. 1. *Above—Parts of abduction splint. Below—Completed splint.*

equal to the upper arm and trunk, are fixed at right angles by tongue and groove mortices or by light angle irons. The end of the arm piece is cut in a circular fashion and grooved as shown in Fig. 1. A corresponding board is cut equal to the length of the forearm and hand and grooved to fit into the upper arm piece (Fig. 1). These are fastened with a wing nut. An adjustable metal strip to which is fastened a handle is attached. Contact surfaces are padded with felt glued to the wooden surfaces. Webbing straps to encircle the chest and abdomen and a shoulder strap are fastened in place by rivets or screws. The forearm piece may be turned so as to fit either the right or left arm. A position of flexion or extension of the elbow and pronation or supination of the forearm may be secured by fixing the lock nuts of the corresponding joints. The position of the hand and fingers is maintained by bandaging lightly the forearm piece and handle. Small, medium and large sizes may be stocked for emergency use in epidemics.

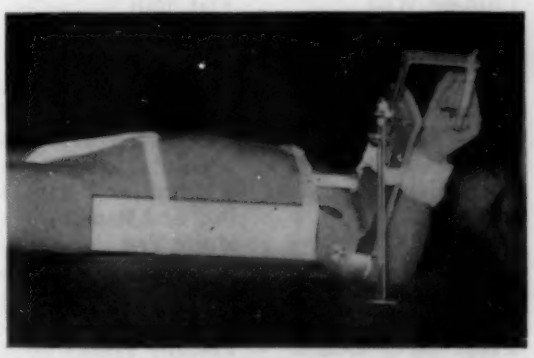

Fig. 2. Abduction splint applied.

Games for Handicapped Children

Helen E. Batten

The Industrial School for Crippled and Deformed Children, Boston, Massachusetts, through the physical education department, has been carrying on a regular schedule of supervised games for ten years. In the education of handicapped children the opportunity for participation in competitive games is a necessary factor for their proper development. When in 1927 two gymnasiums were built, it was decided to have organized games at the recess periods.

At first, the children, who had never played games, felt that it was an impossibility. With encouragement and perseverance, a small number found that they really could throw and catch a ball. The pupils now have three days a week of supervised games under students from a school of physical education, making five classes per day. The lesson begins with breathing and a few general setting up exercises in which each pupil takes part. The games are scheduled a week in advance and a copy sent to each teacher. The majority of the pupils are able to take an active part in the games, having other children run for them if necessary. However, if one or two are unable to play they may be score keepers and derive a great deal of pleasure in watching others. The schedule of games works up to a final athletic meet held in May each year.

The school has three banners which are awarded to winners of inter-class games and letters are assigned to basket ball groups. It is sometimes difficult to plan games in which handicapped groups can take part, though we endeavor to choose those in which the larger groups can play. In the following list are some which have been found satisfactory:

Base Ball	Couple Tag
Call Ball	Black Tom
Dodge Ball	Magic Carpet
Three Deep	Captain Ball
Whip Tag	Bat Ball
Bat Ball	Battle Ball
Long Ball	Corner Spry

Physical Therapist, Industrial School for Crippled and Deformed Children, Boston, Mass.

Squirrel in Trees
Guarding the Throne
Hill Dill
Red Light
Club Snatch
Chinese Wall
Snatch Pin
Farmer in the Dell
Circle Roll Ball
Arch Ball
Dumb Bell Tag
Here we go Looby Loo
Good Morning
Midnight
Crow and Crane
Fox and Geese
Circle Relay
Couple Tag
Progressive Dodge Ball
Center Base
Shoemaker's Dance
Pin Base Ball
Volley Ball
Squash Ball
Japanese Tag
Automobile Race
Cage Ball
Kick Ball
Bean Bag Relay
Simon Says
Twenty-One
Hole Basket Ball
Bombardment
Boundary Ball
Hand Ball
Newcomb
Corner Ball
Fist Ball
Teacher's Ball
Black and White
In and out the Window
Drop the Handkerchief
Kiddie Car Relay
Dog and Bone
Maize Tag
Jacob and Rachel
Cat and Mouse
Dummy Band
Freight Train
Animal Chase
Bronche Tag
Indian Club Relay
Indoor Baseball
Bounce Ball
Prisoners Base
London Bridge
Driving Pigs to Market
Tea Pot (Story Play)
Charlie Over the Water
Hunt the King
Run for your Supper

Below is a copy of the schedule of last athletic meet:

Basket Ball Finals—
High School Girls

Games—
In and out the Window
Magic Carpet
Grades I and II

Squash Ball—
Grade IV vs. Grade VI

Long Ball—
Grade III vs. Grade V

Volley Ball—
Grades VII and VIII
Girls vs. Boys

Setting Up Exercises—
Grades V and VI

Dodge Ball—
Winners of 3 vs. winners of 5

Basket Ball Finals
Boys.

The athletic meets are considered the big events of the year. They stimulate enthusiasm and school spirit and cause the satisfaction of feeling that even with handicaps it is possible to compete with normal children.

In addition to athletic meets the school has two basket ball teams—one for boys and one for girls. This year the teams are exceptionally fine. They have played ten boys' games and five girls' games with outside teams with no handicaps. The rules are not altered in any way. To be sure they cannot always win, although they have won several games in the past few years. The boys have sweaters with monograms and the girls have blue uniforms. The pupils of upper grades are allowed to stay to games at the close of school. Another year a volley ball game with an outside team will be considered.

The Harvard Infantile Paralysis Commission has examined all of our cases by giving each child a special test. The test included activities with apparatus and ability to walk on different surfaces and at different speeds; also a test in general activities, such as ability to manipulate stairs and to seat themselves and get up from a chair, to open doors, cross the street and enter an automobile and also all the activities incident to the care of the person. It was found on testing the children here in the school that due to the physical therapy treatments at the school, the opportunity to participate in plays and games, and the program of having each child do for himself everything possible without assistance, our children rated much higher than children who were tested who were not in attendance at this school. The results were so gratifying that it is proposed to use the achievement of the pupils here as standards for others to attain. These athletics have done a great deal for the pupils. The discipline of the school has been greatly improved. They have also created a spirit of sportsmanship, better morale, less self-consciousness and more initiative, besides developing stronger bodies.

Hyperpyrexia as an Adjunct in the Treatment of Gonorrhea and Syphilis

James E. Potter, B.S., M.D.

Almost every one of the self-limiting pathological conditions is accompanied by a rise in the body temperature. This condition may be either a manifestation of the process of cure or it may be only a reaction of the tissue as a result of infection. It is worthy of note that in certain classes of pathologic conditions that ordinarily are not self-limiting, the rise of temperature occurs only in the terminal stages. The realization of this fact led to the introduction of toxic substances into the body which would create an elevation of temperature. Other modalities such as external dry heat, baths, and electricity have been used in this connection.

To Wagner Von Jauregg[1] goes the credit of first popularizing hyperpyrexia as a treatment for syphilis. In 1917 he reported his epoch making results after giving patients that had general paresis, malaria parasites. His works and methods have been adopted generally throughout the civilized world and are still used by some workers as a selected treatment for cerebrospinal syphilis. In March 1930, King and Coke[2] induced hyperpyrexia by use of diathermia. Carpenter and Boak[3] were the first to use short radio waves experimentally, and they reported excellent results in the treatment of syphilis in rabbits.

Schamberg and Tseng[4] showed that it was possible to raise the temperature to 106 degrees F., by means of hot water baths, and Mehrtens and Poupprit[5] used this method in treating dementia paralytica. In the hot springs of Kusatau, in Japan, with temperatures up to 160 degrees F., arthritic and syphilitic patients have been treated for centuries.

Since my first paper, published in 1931, on this same subject, in which was featured hyperpyrexia induced with diathermia, many modalities have been developed in addition to those already in use. Among the most widely advertised in which the same principle is utilized are: The hot dry-air cabinet, hot moist-air cabinet, infra-red cabinet, electric light cabinet, Kettering hypotherm, vapotherm, Clark's hyperpyrexator, radiotherm, and the electric blanket. In this group the environmental temperature is maintained at a level higher than the internal temperature of the patient. In a second group in which the energy can be induced by diathermia and electromagnetic induction, the temperature of the outside media surrounding the patient is maintained at a much lower level than the rectal temperature reading.

The Kettering hypertherm is air-conditioned. Heat and humidity are automatically controlled. Heated air is passed over the nude patient with sufficient intensity and volume to produce high body temperature.

The vapotherm is a non-air-conditioned cabinet. Nor is the humidity automatically controlled. It depends upon heating the humidified air surrounding the patient, in an enclosed cabinet, to 150 or 160 degrees F., and thus maintaining the body temperature for a prolonged period of time.

Both of these cabinets or modifications applying the same principle are excellent insofar as elevating body temperature is concerned, but from a physiological standpoint, I believe this method produces more shock, hence is conducive to more danger and discomfort to the patient, than that created by electromagnetic induction in the cool cabinet. We have tried some of the former and have discarded all other methods but the following.

The patient is placed in a specially designed cool cabinet. The temperature of the air in this cabinet is maintained automatically between 99 and 100 degrees F. The relative humidity approaches 70 per cent.[6]

From a special adjustable coil suspended above the patient's chest and abdomen, a high frequency magnetic wave is projected through the body tissues. Due to their bio-physical properties, these waves change into heat waves in the more conductive tissues of the

Read before Pierce County Medical Society, March 1937, and at the Annual Meeting of Washington Chapter of the American Physiotherapy Association, Seattle, 1937.

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body. Within one to two hours the internal temperature of the patient is elevated 3 to 5 degrees F. The magnetic wave is then shut off. From this point the artificial fever is similar to a natural fever.

In fever therapy one should strive for:

1. Safety to the patient.
2. Comfort.
3. Elimination of shock producing elements.
4. No deleterious sequellae.
5. Improve the condition for which treatment is being given.

In the past very little consideration was given to the physiology of hyperpyrexia, and few explanations have been offered for some of the phenomena observed. We, as a profession, have been prone to accept what the manufacturer and salesmen promised as results, instead of investigating the why and wherefore.

It is generally accepted that heating, by any high frequency current, occurs in accordance with Joule's law[6]: (1) The heat produced is directly in proportion to the square of the currents' strength. (2) The heat produced is directly in proportion to the resistance of the conductor. (3) The heat produced is directly in proportion to the time during which the current flows.

For every rise of one degree C., the rate of oxidation is increased two and five-tenths times. Cellular oxidations are easily influenced by changes of temperature of only tenths of a degree, and in the physiological processes of inner organs, slight changes in temperature may give results entirely out of proportion to this change; therefore, it does not appear to be necessary that, for clinical effects, the local temperature be raised more than 6 or 7 degrees.[7]

How does the inductotherm produce heat in tissues? When an electric current flows through a coil, there is set up within that coil a magnetic field. The strength of this magnetic field depends on the intensity of the current and the number of turns of the coil, increasing with increase in current and number of turns. Any conductor coming within this field will be heated in proportion to the strength of induction.

This heating is referred to as heating by electro-magnetic induction. Eddy currents are induced in an alternating magnetic field, established by an alternating electric current flowing in the cable electrode of the inductotherm.

If, instead of a simple homogenous conductive material, living tissues are placed within the high frequency magnetic field of the inductotherm coil, eddy currents will also be induced and heat generated as in the case of the simple conductor. The frequency of the induced eddy current will be that of the exciting current from the inductotherm; namely, twelve million cycles per second. This frequency is far above those frequencies which elicit muscular contraction, hence, the only immediate effect of the eddy currents induced in the tissues will be the production of heat.

The inductotherm does not produce heat uniformly in all types of tissues. The outstanding characteristic of the inductotherm is that with it heat is produced at a greater rate in the more conductive than in the less conductive tissues. In this respect it is unique.

In an experiment performed by Merriman, Holmquest and Osborne[8] they proved that with the use of the inductotherm and various strengths of salt solutions, the electrical conductivity of an electrolyte (salt solution in this case) is practically in proportion to the concentration of the salt solution.

Cloetta and Waser[9] were two of the first investigators who proved that currents pass through the tissues instead of being confined to the skin. They placed electrodes on the exterior of an animal's skull and, as the current passed through the brain, a thermometer with its bulb in the lateral ventricle showed a rise of two and one-half degrees F. after ten minutes of electrical application. These experiments have been corroborated by Schliephake[10] who applied electrodes to the temple of a rabbit and inserted a thermocouple needle in the center of the brain. In the narcotized animal a rise of twenty-two and one-half degrees F. was shown after the passage of the current.

Edstrom,[11] in his experiments on a horse, raised the internal temperature of the carpal joints ten to twelve and one-half degrees F. in from fifteen to twenty-five minutes. The carpal joints of a horse are similar in dimensions to the knee joint of man.

Merriman, Holmquest and Osborne[8] reported putting a fine thermocouple into a hypodermic needle and inserting it into a patient's leg for three centimeters. Three turns of inductotherm cable were taken around that leg for a period of twelve minutes. At the beginning of this experiment the temperature of the leg was ninety-four degrees F. In the deep tissues there was an increase of ten

degrees temperature, whereas, in the skin there was much less. The temperature of the subcutaneous fat was about the same as the skin. Also there was less heating in the fascia.

Kovacs,[12] in a series of experiments, proved that internal organs, such as liver, lungs, stomach, and intestines, have varying conductivities, dependent on their relative content of blood, air, connective tissues, and in the case of the hollow viscera, their contents. The above experiments demonstrate beyond a reasonable doubt that the inductotherm will generate heat in an electrolyte at a rate which is proportional to the electrical conductivity of the electrolyte, and that it will generate heat at a more rapid rate in vascular tissues than in bony or adipose tissues. In view of the above, the pancake cable coil should be properly placed and adjusted to attain the best results.

Since the blood is the agency through which oxygen is supplied to the cells, it follows that in those tissues receiving the most copious supply of blood, oxidation and liberation of heat should be more energetic.

The patient should have an empty stomach and intestinal tract. Liquids should be restricted, in the majority of cases, during the treatment. This will reduce sweating to a minimum and will aid in maintaining high temperature levels with the least amount of induction.

METABOLIC CHANGES ASSOCIATED WITH THERAPEUTIC FEVER

Many papers have now been published by bio-chemists, physiologists, and bacteriologists dealing with the changes accompanying artificial fever. The literature has been summarized by Hench, Slocumb and Popp,[13] Bierman,[14] Neymann and Osborne[15] and others. Confirmation is given of such evidence of general increase of metabolic activity as increased pulse rate, increased cardiac output, and increased capillary circulation in the nail beds. The blood pressure shows an initial rise and a subsequent fall as pyrexia continues. There is no change in blood volume or viscosity if intake of fluid is encouraged. The red blood cells usually show no change if fluid is taken freely. The leucocytes show an initial fall and then rise to about 15,000 per cm. Blood urea, uric acid, and creatinine show no change or a slight increase due to blood concentration. There is a decrease of from 10 to 30 per cent in blood sugar during a treatment. Blood phosphorus, plasma lipoids, and serum calcium show a slight increase. The serum protein does not change. There is a slight alteration of the acid-base equilibrium of the blood towards the alkaline. The most important phenomena are the marked fall in blood chlorides,[16] and the associated disappearance of free hydrochloric acid from the stomach.[17] These changes show the need for dilute alkaline drinks during treatment, a need supported by clinical experience. Several workers have estimated that the basal metabolic rate increases by 7 per cent for each degree of fever.[14, 18, 19]

EFFECTS ON THE NERVOUS SYSTEM

There is a marked sedative effect on irritative conditions of sensory nerves which is characterized by pain and on the motor nerves which is characterized by spasms and cramps. There is no generally accepted explanation for the pain relieving effects. It may be that heat in some way lessens nerve sensibility, perhaps as a result of inhibition through temperature nerves of the skin.

That the heat regulating center is influenced by prolonged elevation of body temperature is very apparent. What process is involved is still a mooted question. We have not yet been able to find a satisfactory explanation as to whether the phenomena observed is due to over-stimulation or to a paralysis of this vital center. We know that when the temperature has been elevated beyond a certain point and all induction has been stopped that in some cases the temperature will continue to rise and the patient will go into a state of heat collapse which may prove fatal.

Relative to this, the following personal communication was received from Dr. Paul Flothow of Seattle, Washington:

"We know that the central nervous system is hyper-irritable in the presence of an anoxemia, and it must also be true that the reverse conditions also hold; namely, that central nervous system tissue should be less excitable in the presence of a hyperemia and a hyperoxemia so that when we have these two mechanisms playing, first of all there is a temperature due to an actual heating of the subject. This elevation of temperature produces a generalized vasodilatation which, in turn, increases the blood supply to the heat centers and thus renders this heat center less irritable and less effective, so that the heat center lags behind in its efforts to adjust the

body temperature, thus allowing the temperature to rise to considerable heights, and it is this lag and failure of the heat center to react which results in the continued elevation of temperature after the subject is taken away from the influence of the inductotherm.

"In other words, I would think that the danger point would arise from the fact that the heat centers might fail to react quickly enough to regulate the temperature, and this would produce a vicious circle; vaso-dilatation and lessened heat center control which might result fatally."

This explanation seems logical.

Heat resistant cases often were observed when hyperpyrexia was induced in cabinets in which the environmental temperature was higher than the temperature of the patient. This most often occurred after the patient had received two or three previous treatments. Attempts to elevate the temperature to the desired level in such patients were always followed by discomfort, an unusually high pulse rate, and shock.

Experimental work by Benson[20] indicates that the pulse rate is primarily a function of skin temperature and not of internal temperature of the patient.

TYPE OF CASES TREATED

During the past two years we have given 1181 treatments without a fatality. Twenty-four patients were treated in a modified Kettering hypotherm. Forty-one patients were treated in the vapotherm, and the remaining two hundred and thirty-six were treated in the cool cabinet, using the inductotherm to create the electrical energy.

We have limited our studies in this report to:

Acute and chronic gonorrhea
Acute and chronic epididymitis
Acute and chronic prostatitis
Gonorrheal arthritis, and a few cases of arthritis of other origin
Syphilis:
Acute
Blood stream (Kahn Fast)
Cerebro-spinal syphilis

Many studies have been conducted on the invitro-thermal death time of various strains of gonococci. The results obtained are interesting from a scientific experimental standpoint, but practically it is believed that they add little to the clinical response of patients infected with these organisms. The gonococcus is so unique in its behavior in human tissues that no hard and fast rule can be followed in treating this condition with hyperpyrexia. The rapid clinical improvement that we have observed has been gained by trial and error. However, we believe chemotherapy is indicated in all cases of gonococcus infection.

In September 1936, Walter Simpson and his co-workers published some interesting results on the response of acute experimental syphilis, in rabbits, to artificial hyperpyrexia. They proved conclusively the spirocheticidal effect of sustained high body temperature.

It is quite conceivable that the same uniformity in results might not obtain following the application of fever therapy to human subjects. Syphilis in rabbits apparently pursues a somewhat milder course; generalized lesions and central nervous system involvement are comparatively rare.

Many observers are convinced that fever therapy is capable of producing a distinctly favorable influence on the progress of early syphilis, particularly when fever therapy is combined with orthodox chemotherapy.

Kyrle was one of the first workers to utilize this idea when he gave 232 seropositive patients with early syphilis (under two years' duration), a course of arsphenamine (from 4 to 6 gm.), followed by malaria therapy (ten chills), followed in turn by another course of arsphenamine therapy. The results were incomparably better than by any other method employed. Of the 232 seropositive patients with early syphilis, the blood serologic reactions were favorably influenced in 230 (99.1%) after a single combined arsphenamine-malaria-arsphenamine course. Fifty-four of these patients had exhibited positive spinal fluid reactions. All were reversed to negative and remained negative.

Simpson and his co-workers, in the same article, confirmed our statements made in May of the same year, that the results obtained in the treatment of symptomatic neuro-syphilis, asymptomatic neuro-syphilis, and resistant seropositive syphilis are at least comparable, if not superior, to the results obtained with the more hazardous and inconstant malaria therapy. They also confirmed our observation that artificial fever therapy fortifies and intensifies the action of antisyphilitic and antigonococcic chemotherapeutic agents.

PREPARATION OF THE PATIENT

The preparation of the patient for fever therapy is just as important as for a major

operation. A careful physical examination should be made, and the patient should be under direct supervision for at least five days prior to the date of treatment. Aged and debilitated patients should be built up. They are poor risks under ideal conditions. In addition to the routine heart and chest examination, blood pressure, urine analysis, basal metabolism rates and blood chemistry, when indicated, should be made. Sedimentation rate will aid materially in calculating the duration of fever exposure. When basal metabolism rate is below normal limits, thyroid extract should be given. Low blood calcium, a high creatin percentage and a rapid sedimentation rate are always indicative of a poor fever risk. The patient is placed upon a high caloric diet, sugar in the form of candy and chocolate is encouraged.

Patients treated for gonorrhea and its complications should receive three preliminary intravenous injections of 1 per cent mercurochrome in 50 per cent glucose, at 48 hour intervals. This will stimulate a leucocytosis and cause a rise in the opsonic index. Mercurochrome and glucose also have a bacteriostatic action. Vitamins in the form of viosterol and cod liver oil are liberally prescribed. The night before treatment is scheduled, a large dose of magnesium sulphate is ordered. If complete evacuation has not occurred, a soap suds enema is prescribed two hours prior to treatment. Fluids are restricted twelve hours prior to the date of treatment in all cases except acute syphilis, and very little fluid is given during the treatment. The patient should enter the cabinet with an empty stomach and intestinal tract.

When the patient reports for treatment he is given one-eighth grain of morphine, hypodermically, put to bed for thirty minutes, after which he is placed in the cabinet and two drams of phenobromide is administered orally. This will usually allay nervous apprehension, irritability, and is conducive to drowsiness and sleep. It is rarely necessary to repeat this if patient has been properly prepared.

A treatment usually consists of five hours with the temperature ranging from 104 to 107 degrees F., plus.

It requires about 90 minutes to raise the temperature to 105 degrees F. To raise it more rapidly is inviting trouble. The inductotherm is cut off at this level and the patient's temperature will continue to rise one or two degrees higher during the ensuing three hours. If the temperature does not continue to rise within thirty minutes after the inductotherm has been cut off, it will be necessary to cut in again for a period of not more than fifteen minutes, in order to reach the desired level. The patient is then covered with a terry cloth. This serves a two-fold purpose. It absorbs the moisture from the perspiring body and prevents heat loss. It usually requires from two to three hours to cool the patient to normal. A nurse or physician is in constant attendance. Temperature, pulse and respiration of patient, and temperature of cabinet are taken at fifteen minute intervals and recorded.

Danger Signs and Treatment of Heat Collapse

An intravenous preparation of 10 per cent glucose in normal saline, an apparatus for giving carbogen, and an ampule of caffeine and sodio-benzoate, together with a sterile hypodermic set, should be standard equipment and ready for use at a moment's notice.

No danger signs may be anticipated, if the patient has been properly prepared, until the rectal temperature reaches 103 degrees F.

As a rule he is more uncomfortable when the temperature ranges from 103 to 104 degrees F. than at any other time during the treatment. Morphine sulphate, grains ⅛, is repeated at this time if air hunger, cyanosis, and rapid pulse develop. The inhalation of carbogen for a few minutes will tide him over and the treatment can be continued. If he demands liquids, a small amount of tap water is given. The pulse rate will improve almost immediately, but this will also block the even rise of temperature, and water should be used sparingly.

The final and most alarming condition that arises in the course of therapeutic fever treatment is what we term heat collapse. This occurs after the inductotherm has been cut off and the temperature continues to rise regardless of cooling measures. The heat regulating center has lost control and the symptoms of heat collapse are ushered in with alarming rapidity. They are first manifested by rapid, shallow breathing, cyanosis, and weak, rapid, irregular pulse. The patient may develop convulsions or pass into a state of coma from which he cannot be aroused. Evacuation of feces and urine occurs spontaneously. The pupils become widely dilated and all eye reflexes are absent. The skin is dry and hot and the temperature continues to rise

to 108.6 degrees F., or higher before it can be brought under control. The condition is extreme and nothing but extreme measures will save his life. If heat collapse occurs:

(1) Remove patient immediately from the cabinet.
(2) Inject one ampule of caffeine and sodiobenzoate, hypodermically.
(3) Do not waste too much time trying to cool patient by mechanical means.
(4) Administer 1000 c.c. of 10 per cent glucose and normal saline, intravenously.
(5) Have patient inhale carbogen while saline is being administered.
(6) Artificial respiration may be necessary for a while.
(7) Do not give up too soon if patient appears to be dead.
(8) The cooling reaction will be a slow process.
(9) Adrenalin is contra-indicated in pending heat collapse because it contracts the superficial capillaries, thus retarding the loss of heat through the skin.

Breathing will at first become easier after which the temperature will recede and other symptoms will rapidly improve when the temperature starts to fall. Patient should then have complete rest and supportive treatment for the next three days.

RESULTS OF TREATMENT

Acute gonorrhea requires five treatments with a temperature range of 106 to 107 degrees F., for a period of at least three hours during the treatment. All cases so treated have been cured and no complications have developed.

Acute and chronic epididymitis respond equally as well and require about the same length of time.

We have found that heat treatments do not shorten the course of chronic gonorrhea and in most cases seem to exert a deleterious effect.

When mixed infections are found in chronic posterior urethritis, heat will cause the disappearance of the gonococcus from the culture, but you are still confronted with the inevitable morning discharge. The condition has not been materially improved after subjecting the patient to a trying and uncomfortable ordeal. We have discontinued using heat in this type of case.

We feel that heat treatments are indicated in both acute and chronic prostatitis. The prostate returns to normal size and pus cells disappear from expressive secretion much more rapidly when fever is used.

We have obtained remarkable results in treating rheumatism of gonorrheal origin with fever; however, in addition to the elevation of temperature we massage the prostate and vesicles and prescribe large doses of concentrated vitamin "D" in the form of viosterol and cod liver oil.

Due to vaso-motor instability, the temperature range on these patients is kept much lower, rarely exceeding 104 to 105 degrees F., and is maintained for shorter periods.

We have attained indifferent results in treating other types of rheumatism. In fact our results are far from satisfactory.

In previous reports we stated that acute syphilis did not respond well to fever therapy. In fact, our results were so unsatisfactory that we advised against using fever in this condition. However, by further study during the past six months, we have found that excellent results can be obtained if the following routine is carried out in acute syphilis:

1. Prepare as above without restricting fluids.
2. During treatment force normal saline by mouth, and do not elevate temperature to more than 105 degrees F.
3. Hold at this level for six hours or more.
4. Neo-arsphenamine can be given at three day intervals with impunity.
5. Space treatments at five day intervals.

In all cases recently treated by this method, the local lesions (chancres) have healed rapidly and the serum reactions have become negative in from twenty to forty days.

In the light of further study, results have been rather disappointing in treating Kahn Fast cases.

In a previous paper, we reported that eighty-eight patients out of one hundred seven had become operative. Since that report, in May 1936, twenty of those cases have become positive, serological readings ranging from two to four plus.

In syphilis involving the nervous system, there are no modalities on procedure from which we have attained such striking results. Clinically, the patient improves rapidly, spinal fluid examination reveals a rapid return to normal, and up to the present time we have not had a single relapse. There has been one striking clinical feature in these cases. It requires less time to elevate the temperature; they can stand higher temperature for

a longer period of time; pulse rate remains consistently lower, and they have less shock and discomfort than any other class of patient we have treated.

CONCLUSION

Physical agents used for the production of therapeutic fever are of two classes. First, those operating in a media higher than the body temperature. Second, those operating in a media lower than body temperature. The former is not considered physiologically as desirable as the latter. The bio-physical action of the latter, in which the heat is generated within the body, the lessened shock producing elements involved, the added comfort to the patient, and the consistently lower pulse rate that occurs when prolonged high temperature levels are maintained by the application of electro-magnetic conduction in the cool cabinet, is our method of choice.

Acute gonorrhea, acute prostatitis, acute epididymitis, gonorrheal arthritis, and cerebrospinal syphilis respond quickly and permanently to fever therapy. In chronic gonorrhea and blood stream syphilis we feel that fever therapy is not indicated.

The proper selection and careful preparation of patients for fever therapy is just as important as using the proper technique when giving a treatment.

The most outstanding results have been obtained in syphilitic patients with cerebrospinal involvement. Physical improvement and the return of metal activity have given these patients an optimistic outlook which has helped to transform them from potential public charges to useful citizens.

Hyperpyrexia may prove dangerous or fatal by mismanagement in emergencies unless given by skilled operators.

The failure to attain sufficient fever elevation, and maintain it for a prolonged period of time, has done much to bring this form of therapy into disrepute.

Chemotherapy, as outlined in a previous article, pushed to tolerance, and spinal drainage, are of vital importance in the treatment of cerebrospinal syphilis.

BIBLIOGRAPHY

1. Wagner von Jauregg: The Treatment of General Paresis by Innoculation of Malaria. J. Nerv. and Ment. Dis., 55:369-375, May 1922.
2. King, J. C., and Cocke, E. W.: Therapeutic Fever Produced by Diathermy, with Special Reference to Its Application in the Treatment of General Paralysis. South. M. J., 23, p. 222-228, March 1930.
3. Carpenter, C. M., and Boak, R. A.: The Effect of Heat Produced by an Ultra-High Frequency Oscillator on Experimental Syphilis in Rabbits. Am. J. Syph., 14, p. 346, 1930.
4. Schamberg, J. F., and Tseng, H. W.: Experiments on Therapeutic Value of Hot Baths: Physiologic Observations. Am. J. Syph., 11:337, July 1927.
5. Mehrtens, H. G., and Pouppirt, P. S.: Hyperpyrexia Produced by Baths. Arch. Neurol. and Psychiat., 22:700, October 1929.
6. Joule's, The Principles of Electrotherapy and Their Practical Application. 2nd Ed. Oxf. Med. Publ., 1929, p. 113.
7. Cumberbatch, E. P., and Robinson, C. A.: Treatment of Gonococcal Infection by Diathermy. C. V. Mosby, St. Louis.
8. Merriman, J. R.; Holmquest, H. J., and Osborne, S. L.: New Method of Production of Heat in Tissues. Am. J. Med. Sc., 187:677-683, May 1934.
9. Cloetta and Waser, E.: Beitrage zur Kenntniss des Fieberan Steiges, Arb. d. exper. Pathol. u. Pharmakol., June 25, 1914.
10. Schliephake, Erwin: Kurzwellentherapie, Jena, Gustav Fischer, 1932.
11. Edstrom, G.: Thermal Effect of Diathermy in Treatment of Joints, Act. Rheum., 1931, 3,10.
12. Kovacs, Richard: Therapeutic Hyperpyrexia, with Special Reference to High Frequency Methods. Med. Rec., 140:245-248, Sept. 5, 1934.
13. Hench, P. S., Slocumb, C. H., and Popp, W. C.: Jour. A. M. A., 104, 1779, 1935.
14. Bierman, W.: Radiothermy—Fever Produced by Short Radio Waves. Arch. P. T., 13:389-401, July 1932. Also in Brit. J. Phys. Med., 7:155, 1932.
15. Neymann, C. A., and Osborne, S. L.: Development of Hyperpyrexia, Arch. P. T., 15:149-155, March 1934.
16. Simpson, W. M.: Fever Heat Treatment. Jour. A. M. A., 100:67, June 7, 1933.
17. Simpson, W. M.; Kislig, F. K., and Sittler, E. C.: Hyperpyrexia. Ann. Int. Med., 7:64, July 1933.
18. Neymann, C. A., and Osborne, S. L.: Am. J. Syph. and Neurol., 18:28, January 1934.
19. Tenney, C. F.: Artificial Fever Produced by Short Wave Radio. Ann. Int. Med., 6:457, October 1932.
20. Relative Influences of External and Internal Body Temperature Upon Heart. Arch. P. T., 15:303, March 1934.

Hallux Valgus: A Simplified Operation with the Results of Eighty-Five Such Operations

E. K. Cravener, M.D., F.A.C.S.

A hallux valgus is a valgus deviation of the great toe. It is completely beside the point that the whole subject is misnamed, for while "hallux" means thief and "hallex" means toe, either a hallex valgus or hallux valgus is a deforming and frequently painful disorder. We cannot, as physicians, be condemned if we view the deformity with disdain and concentrate on the disability which this disorder causes.

The causes of hallux valgus are legion and the literature voluminous. Out of the haze, which surrounds this common deformity, we can classify hallux valgus as due to (at least):

1. Metatarsus varus.
2. Lateral displacement of the sesamoids.
3. Lateral displacement of the extensor hallucis longus.
4. Lateral rotation of the great toe.
5. Phylogenic reversion of the foot to an earlier type.
6. Traumatic contracture of the adductor hallucis.
7. Simple postural change from adduction of a pronated foot.
8. Metatarsus atavaticus.

Of course, the patient does not complain of any of the above as such. He knows that he has a bump on the inner side of the great toe and it hurts. He recognizes his valgus deformity, but that bothers nothing but his vanity.

Given that the patient has this, what must we do? First, we must free him from pain and, if possible, correct his deformity. Certainly we must not increase his foot pain, as can occur after the Mayo operation.[1] Nor should we disable him for an unnecessary length of time, as demanded by some procedures.[2,3] Surely we must occasion the least possible operative trauma,[4] lest a subsequent rigid toe develop. We cannot do elaborate operations whose end results will be no more perfect than are simple and less deforming operations.[5]

What can be done? First, define the type of hallux valgus. Should it be due to a metatarsus varus (as are but two in this series), a wedge must be removed from the outer side of the proximal head of the first metatarsal and this bone fused to its fellow.[2] A tenotomy of the adductor hallucis[6] may be necessary to allow replacement of the distorted head. But if these two conditions are not present, then we are advised to do a mid metatarsal osteotomy (Juvara),[5] to resect the metatarsal head (Mayo),[7] to resect the proximal phalangeal head,[8] to remove the bone under the cartilage of the first metatarsal head (Soresi),[9] to do a wedge osteotomy of the first metatarsal head and remove the exostosis (Peabody),[9] or to do either, without demonstrable difference in result (Lloyd),[10] or to do a tenotomy of the extensor hallucis longus and to transplant the abductor hallucis farther forward on the first phalanx (Vance),[11] or finally, follow McBride and remove the outer sesamoid, transplant the adductor hallucis and remove the exostosis.

Such a mass of conflicting advice can only confuse a conscientious operator. It is necessary again to reiterate the reasons for operation:

1. To relieve pain.
2. To reduce deformity.

The greatest pain in a bunion is due to shoe pressure on the exostosis and its companion bursa. So then, why not remove the exostosis, for as long as it remains it will increase in size. Then, cosmetically, we can improve the stance and bring the great toe closer to its fellow metatarsals. This can be done best by overbalancing the pull of the adductor hallucis by the pull of the abductor hallucis. For these reasons we have devised and successfully used the following operation, which greatly resembles McBride's operation but was first used by us in 1932, antedating, in

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our hands only, McBride's publication by three years.

Operation

The skin of the forefoot and ankle are prepared for twelve hours prior to the operation. A table preparation of tincture of metaphen is applied and novocaine conduction anesthesia used.

A two-inch incision is made through the skin on the anterolateral aspect of the great toe joint. The capsule is incised and dissected free from the overlying bursa and medial ligament and tendon of the abductor hallucis. The great toe is flexed and retracted laterally. The exostosis is carefully removed and with it the overlying periosteum and capsule. The head is remodeled so that the medial side of the articular surface of the great toe joint is overhung by the proximal side of the first phalanx. The toe is then pulled medially and the remaining structures—that is, the abductor hallucis, the medial ligament and shreds of the capsule—are reefed so that a fold, sufficient to absorb the slack, is made. This is made permanent by heavy catgut sutures. At this time the great toe will stand in neutral and the first metatarsal (except in cases of metatarsus varus) will be closely approximated to its fellow.

The wound is closed in layers. Occasionally the extensor hallucis longus tendon is transplanted to the medial side of the first phalanx (if the tendon is found to be laterally displaced) and the skin closed with Michel clips.

Post-Operative Care

No weight bearing is allowed for seven days. On removal of the clips, contrast bathing is begun. A few days later (when the sympathetic edema subsides) weight bearing is permitted. Shoes are worn at the earliest possible moment. Usually a small rubber pad is worn between the first and second toes at night for the first two post-operative months.

Results

Two criteria must be observed in evaluating results in hallux valgus:

1. Anatomic
2. Functional

To this writer, the first (anatomic) is negligible. No one dies because his great toe deviates from normal. Certainly, however, great morbidity and, I suspect, some mortality follows infection of the irritated bursa over the hallux valgus. In this paper and to this author, nothing is important in the cure of this disease save removal of a potential cause of danger (i.e., the irritated bursa) and the restoration of a painless, normal gait. If we restore the normal appearance of the foot, then this must be counted as an unnecessary but somewhat desirable feature.

For the purpose of this study, eighty-five consecutive surgically treated bunions have been studied. All were operated by the same surgeon and by the same technique. They present a wide range of age, social condition and cause. All have been followed from six months to six years. The charts presented herewith graphically show the results. Roughly, they are these: Of the eighty-five cases, seventy-seven or 90 per cent show no abnormal deviation of the great toe or have pain. Of the remaining 10 per cent, two or 2.35 per cent have developed an exostosis in the region

Table I.—*Number of Cases by Chronological Age.*

Age of Patients	11 to 20 years	21 to 30 years	31 to 40 years	41 to 50 years	51 to 60 years
Number of Cases	6 or 7%	26 or 31%	15 or 18%	20 or 23%	18 or 21%
Cures by Chronological Age					
Age of Patients	11 to 20 years	21 to 30 years	31 to 40 years	41 to 50 years	51 to 60 years
Number of Cases	6 or 8%	26 or 36%	12 or 16%	16 or 20%	17 or 20%
Failures by Chronological Age					
Age of Patients	11 to 20 years	21 to 30 years	31 to 40 years	41 to 50 years	51 to 60 years
Number of Cases			3 or 37.5%	4 or 50%	1 or 12.5%

formerly occupied by the exostosis; four or 4.70 per cent have a recurrence of a valgus deformity of the toe without pain; and finally, two or 2.35 per cent have 50 per cent limitation of the motions of the great toe, sufficient to cause pain in extreme dorsiflexion of the toe. From the asthetic and clinical viewpoint, 7.1 per cent can be regarded as failures. From the clinical and reasonable point of view, only two or 2.35 per cent can be so regarded.

The failures can be partially explained. One of the stiffened joints followed wound infection which occurred when the patient left the hospital and became resident in a home already quarantined for scarlet fever. The other stiffened joint (the first of this series) can be attributed to the surgeon's failure of early mobilization after operation.

The author has no reasonable explanation of the recurrence of the exostosis. It is believed due to the proliferation of retained islands of periosteum. In two of the recurrent valgus deformities, infection forbade early motion and retention between exercise periods. The other two cases failed, since the strong and contracted adductor hallucis prevented full correction of the deformity. These last were due to errors of operative judgment and will be prevented in the future by section of the adductor tendon in those cases which show grave deformities.

Many individuals have avoided bunion operations because of the prolonged disability so common after this minor operation. We wish to show that the old statement, "Don't have your bunions operated, or you'll be laid up for months," is completely false. In this series of eighty-five cases, only fifteen or 18 per cent had disabilities from any connected or remote cause for more than twenty-two to twenty-eight days. Thirty-one or 36 per cent recovered in fifteen to twenty-one days. Thirty-nine or 46 per cent were well in eight to fourteen days.

The prolonged disabilities can be explained thus. Six cases were in highly nervous women, in two of whom a true mental failure could be reasonably diagnosed. All finally recovered in the fourth week but taught the surgeon to guard his prognosis when confronted by this type of individual. Two bunions occurred in patients who presented the sequelae of encephalitis. Cures in these cases were delayed from three to four weeks. Three cases were delayed by wound infection. One, previously mentioned, lived among scarlet fever patients and developed a wound infection. Another developed abcesses about a Michel clip wound, and a third, since we know of no other cause, must be regarded as an operating table infection. All, however, recovered in twenty-two to twenty-eight days. Forty-six per cent of the cases required only eight to fourteen days for full recovery. This period was not influenced by age or bunion type. Surprisingly, of those who recovered in eight to fourteen days, 10 per cent were over fifty years of age and 10 per cent were under twenty. Those remaining varied from twenty-one to fifty years of age and all figures show (if the factor of random sampling is removed) that advancing age neither helps nor delays the candidate for a bunion operation. Thirty-one cases or 36 per cent recovered in two to three weeks. Again the figures are not conclusive. It is true, as shown in Chart III, that most of this group were between forty and sixty years of age. However, the statistical universe is too small to allow a conclusion.

The last group, that is, those whose cure

TABLE II.—*Morbidity Table.*

	Number	Percentage
Those disabled 8 to 14 days	39	46
Those disabled 15 to 21 days	31	36
Those disabled 22 to 28 days	15	18
Total	85	100

TABLE III.—*Breakdown of Morbidity by Age Periods.*

	11 to 20 years	21 to 30 years	31 to 40 years	41 to 50 years	51 to 60 years	Total
Those disabled 8 to 14 days.....	4 or 10%	16 or 41%	12 or 31%	3 or 8%	4 or 10%	39 or 46%
Those disabled 15 to 21 days....	2 or 7%	6 or 19%	1 or 3%	12 or 39%	10 or 32%	31 or 36%
Those disabled 22 to 28 days....		4 or 27%	2 or 13%	5 or 33%	4 or 27%	15 or 18%

required three to four weeks, may well be termed the accidental division. As explained above, most of these suffered complications which delayed healing or were to themselves their poorest friend.

CONCLUSION

We believe:

1. That bunion operations can be successfully performed.
2. That three weeks is sufficient time for full recovery from a bunion operation of the type suggested here.
3. That age is no factor in morbidity.
4. That the simple operation, as done on this group, is sufficient to cure the usual hallux valgus.
5. That any operation, which shortens or distorts the first metatarsal great toe length, can be supplanted to the patient's benefit by this operation, which does not disturb the mechanics of the foot.

BIBLIOGRAPHY

1. Gaynor, S. S.: Severe Disabling Metatarsal Prolapse, Med. Record 145:298, Apr. 7, 1937.
2. Lapidus, Paul W.: Operative Correction of the Metatarsus Varus Primus in Hallux Valgus, S. G. & O. LVIII: 183, Feb. 1934.
3. Soresi, A. L.: The Radical Cure of Hallux Valgus (Bunion), S. G. & O. LII:776, Mar. 1931.
4. Stanley, Leo L. and Breck, Louis W.: Bunions, J. Bone & Joint Surg. XVII:961, Oct. 1935.
5. Christidi, E.: Le Procede de Juvara Dans Le Traitement De L'Hallus-Valgus, Lyon Chirurgical, 34:4 p. 32, 1937.
6. McBride, Earl D.: The Conservative Operation for Bunions, J. A. M. A., 105:1165, Oct. 12, 1935.
7. Mayo, C. H.: The Surgical Treatment of Bunion, Annals of Surgery, XLVIII:300, 1908.
8. Kasper, Max: Die Resektion der Grundphalanx als Operation des Halluxvalgus Beitrage zur klinischen Chirugie 157:113, Feb. 1933.
9. Peabody, C. W.: The Surgical Care of Hallux Valgus, J. Bone & Joint Surg., XIII:273, Apr. 1931.
10. Lloyd, Eric: Hallux Valgus: A Comparison of the Results of Two Operations, Brit. J. Surg. XXIV:341, Oct. 1936.
11. Vance, E. B. M.: The Treatment of Bunions, Med. J. Australia I:202, Feb. 10, 1934.
12. Brookes, T. P.: Hallux Valgus: Post-Operative Physical Therapy, Arch. P. T., XVII:87, Feb. 1936.
13. Hiss, J. M.: Hallux Valgus, Am. J. Surg. XI:51, Jan. 1931.

Approved Schools for Physical Therapy Technicians

The "Essentials of an Acceptable School for Physical Therapy Technicians," promulgated by the Council on Medical Education and Hospitals, were adopted following a survey of opportunities for such training in the United States, made from 1933 to 1936. The House of Delegates of the American Medical Association passed on the standards proposed at the Kansas City session, May 9, 1936. Approved schools or physical therapy technicians were first listed in The Journal of the American Medical Association, Aug. 29, 1936.

The American Congress of Physical Therapy and the American Physiotherapy Association have accorded the Council their full cooperation in the establishment and maintenance of standards in this field.

While the number of schools thus far approved is limited to fourteen, several others are under consideration. Additions to the list will be made as other schools apply and are found eligible.

Applications have been received from schools of massage erroneously labeled as physical therapy schools. The Council has not adopted standards for training in massage, since this is only one phase of the broad field of physical therapy. The abuse of this valuable means of therapy by cult practitioners and technicians in attempting to cure internal conditions is too well known and any official endorsement of training for this single method of treatment could only result in encouraging quackery. It is for this reason that the Council has designated in the "Essentials" that "acceptable schools for training physical therapy technicians may be conducted by accredited universities, colleges or hospitals." Commercial schools, then, cannot be considered for recognition.

The American Registry of Physical Therapy Technicians, sponsored by the American Congress of Physical Therapy, has become recognized during the past three years as a means of identifying those qualified. The Board of

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Registry accepts for examination graduates of schools approved by the Council on Medical Education and Hospitals. The objects of the Registry among others are:

"To maintain the minimum standards of educational and technical qualifications as given by the Council on Medical Education and Hospitals of the American Medical Association for technicians administering physical therapy in hospitals, clinics and physicians' offices.

"To cooperate with the Council on Medical Education and Hospitals of the American Medical Association in its investigation, classification and periodic inspection of schools which conduct training courses for physical therapy technicians."

Information concerning registration may be secured through Miss Marion G. Smith, registrar of the American Registry of Physical Therapy Technicians, 30 North Michigan Avenue, Chicago.

APPROVED SCHOOLS FOR PHYSICAL THERAPY TECHNICIANS

The following list of schools for physical therapy technicians represents the fourth printing made since the House of Delegates of the American Medical Association adopted standards for such schools in 1936.

Name and Location of School	Direction	Entrance Requirement	Length of Course	Student Capacity	Tuition	Certificate, Diploma, Degree
Children's Hospital, Los Angeles[1]	John C. Wilson, M.D.	(a) R.N. (b) Grad.phys.ed.	12 mos.	10	$125	Diploma
Stanford University Hospitals, San Francisco	W. H. Northway, M.D.	(a) R.N. (b) Grad.phys.ed.	12 mos.	6	$215	Certificate
Walter Reed General Hospital, Washington, D. C.[2]	Maj.W.W. McCaw, M.D.	Grad. phys. ed.	12 mos.	10	None	Certificate
Northwestern University Medical School, Chicago[3]	John S. Coulter, M.D.	(a) R.N. (b) Grad.phys.ed. (c) Coll. grad.	9 mos.	13	$200	Certificate
Bouvé-Boston School of Physical Education, Boston[4]	Howard Moore, M.D.	High school grad.	3 and 4 yrs.[a]	40	$400 yr.	Certificate or B.S.
Harvard Medical School, Course 445, Boston[5]	F. R. Ober, M.D.	(a) R.N. (b) Grad.phys.ed. (c) Coll. grad.	9 mos.	16	$150	Certificate
Boston University, Sargent College of Physical Education, Cambridge, Mass.[6]	Prof E. Hermann, Dean	High school grad.	4 yrs.	25	$340 yr.	B.S.
Battle Creek College, Battle Creek, Mich.[7]	Paul Roth, M.D.	(a) R.N. (b) Grad.phys.ed. (c) Coll. grad.	12 mos.	..	$250	Certificate or B.S.
St. Louis University School of Nursing, St. Louis[8]	A. J. Kotkis, M.D.	High school grad.	4 yrs.	4	Univ. fees	B.S.
University of Buffalo, Buffalo[9]	G. G. Martin, M.D.	R.N.	18 mos.	8	Univ. fees	B.S.
Hospital for Ruptured and Crippled, New York City[10]	K. G. Hansson, M.D.	(a) R.N. (b) Grad.phys.ed.	9 mos.	15	$300	Diploma
D. T. Watson School of Physiotherapy (affiliated with Univ. of Pittsburgh School of Medicine), Leetsdale, Pa.[11]	Jessie Wright, M.D.	(a) Grad.phys.ed. (b) 2 yrs. premed.	22 mos.	8	None	Diploma or B.S.
College of William and Mary, Richmond, Va.[12]	H. H. Hibbs Jr., Ph.D.	(a) R.N. (b) Grad.phys.ed. (c) 3 yrs. coll.	9 and 12 mos.[b]	6	Coll. fees	Certificate
University of Wisconsin, Madison[13]	E. A. Pohle, M.D.	(a) R.N. (b) Grad.phys.ed.	9-12 mos.	20	Univ. fees	Certificate

NOTES

a. Four year course leads to B.S. degree from Simmons College.

b. Twelve month course for those with three years college.

AFFILIATED CLINICAL FACILITIES

1. Glendale Sanitarium and Hospital, Glendale, and Cedars of Lebanon Hospital, Good Hope Clinic and Los Angeles County Hospital, Los Angeles.

2. Langdon School for Crippled Children, Washington, D. C.

3. Michael Reese Hospital, Montgomery Ward Clinics, Passavant Memorial Hospital and St. Luke's Hospital, Chicago.

4. Boston City Hospital, Children's Hospital, Massachusetts General Hospital and Robert Breck Brigham Hospital, Boston; Cambridge Hospital, Cambridge, and Newton Hospital, Newton.

5. Children's Hospital and Convalescent Home, Harvard Infantile Paralysis Commission Clinic, Industrial School for Crippled and Deformed Children, Massachusetts General Hospital, Peter Bent Brigham Hospital and Robert Breck Brigham Hospital, Boston, and Cambridge Hospital, Cambridge.
6. Industrial School for Crippled and Deformed Children, Massachusetts General Hospital, Massachusetts Memorial Hospitals and Perkins Intitute for the Blind, Boston, and Cambridge Hospital, Cambridge.
7. Ann J. Kellogg School, Battle Creek and Battle Creek hospitals.
8. Firmin Desloge Hospital, Mount St. Rose Sanatorium and St. Mary's Hospital, St. Louis.
9. Buffalo City Hospital, Buffalo.
10. French Hospital, New York Hospital, New York Polyclinic Hospital and Reconstruction Hospital, New York City.
11. Allegheny General Hospital, Children's Hospital, Elizabeth Steel Magee Hospital, Falk Clinic, Industrial Home for Crippled Children and St. Francis Hospital, Pittsburgh.
12. Crippled Children's Hospital, Stuart Circle Hospital and Wheeldon Clinic, Richmond.
13. State of Wisconsin General Hospital, Madison.

Osteoclasis of the Bones of the Forearm for Supination Deformity

W. P. Blount, M.D.

Infantile paralysis and the whole arm type of brachial birth palsy frequently cause a supination deformity of the forearm. The contracture proves most disabling and unsightly. In her attempts at obtaining active motion, the physical therapist often is blocked by bone deformity as well as by muscular and ligamentous contracture. Tenotomies and muscle transplants are then inadequate and the attack must be on the bone.

In 1933 the Fracture Service of the Milwaukee Children's Hospital began a study of forearm fractures in children. I was impressed by the perfect end results obtained following closed reduction even when the fragments were left in malposition. No deformity could be found after six or eight months, even by x-ray. Open reductions occasionally were followed by deformity and disability, but never the closed. The assurance with which one could expect a normal arm after fracture led me to produce a fracture in the interest of treatment.

Osteoclasis was one of the earliest operations of orthopedic surgery. In the treatment of varus, valgus, and tortion deformities of the lower extremities it is often the procedure of choice, particularly after preliminary demineralization of the bones with a plaster cast.

In 1933 a child presented herself with atrophy of all of the structures of the forearm and a fixed supination deformity of 70 degrees as the result of infantile paralysis. Attempts at rehabilitation of the hand were futile until it could be brought into a more normal position. None of the accepted muscle transplants would have affected the deformity. Stretching by the physical therapist was of no avail. X-ray showed actual deformity of the bones and a degree of osteoporosis usually obtained in plaster before osteoclasis. Artificial fracture at once suggested itself. Under gas anesthesia the bones were broken at the middle. The arm could then be rotated easily into full pronation. A plaster cast was applied from the knuckles to above the bent elbow with slightly less than full correction. There was almost no postoperative pain. After four weeks the plaster was removed and physical therapy resumed. Not only was the deformity overcome, but in a few weeks useful motion appeared in pro- and supination.

The success of this attempt led to the use of the procedure in five other cases of poliomyelitis and in three of brachial birth palsy. Similar osteoclases were done in two cases of congenital abnormality of the bones of the forearm, one a pronation deformity. One boy was fifteen years old. The result was excellent, but the procedure cannot yet be generally recommended in children over twelve. In cases of extreme paralysis following poliomyelitis, the cosmetic result justifies the operation, even though little functional improvement can be expected. One must be prepared for some recurrence of the deformity, however. In one of the cases the procedure was repeated after four years.

From the Milwaukee Children's Hospital and the Marquette University Medical School, Milwaukee, Wisconsin.

New England: Seventeenth Annual Convention

Closely packed within the borders of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut is the greatest selection of natural scenic beauty to be found anywhere in an area of equal size. Lakes, mountains, seashore and countryside are all within easy traveling distances of each other and good roads are everywhere. Ideal air and water temperatures for swimming, 2,500 miles of seacoast with sheltered harbors for boating and sun-drenched beaches for lolling and bathing, trails to hike and mountains to climb, wild forests for hunting and fast flowing streams for fishing, excellent golfing greens and fine tennis courts—these are a few New England attractions for the active sports enthusiast.

There is so much of interest in New England —old houses of antique charm to visit, historical locales to see, museums to "do," art exhibits, concerts, literary and religious shrines, world-famous colleges, large busy cities, small quiet villages, dance festivals, country fairs, summer theatres. And as for food, New England's famous dishes—seafoods, Boston baked beans, baked Indian pudding, cranberry sauce, apple cider, to mention just a few—are palate-tickling delicacies that have never been equaled.

But first you should know what attractions exist right around Boston and the Hotel Somerset. You will be situated just a few steps from the Fenway, a garden of beautiful plantings that borders Muddy River and wanders from the Charles River Basin, across Boston and through Brookline. The Fenway leads into the Jamaicaway, which will bring you to the Arnold Arboretum, one of the finest and most complete botanical gardens in the world. You also will want to visit the Rose Garden in Franklin Park. On your list of "musts," of course, are the Boston Common and the Public Gardens, twin parks in the heart of the city. And you really should take a ride on the Garden swanboats.

In Copley Square, opposite Trinity Church, one of the finest works by H. Richardson, is the Boston Public Library, designed by Stanford White. As well as containing many rare volumes, the building also houses paintings by John Singer Sargent, the Abbey Holy Grail murals and the Puvis de Chavannes murals. One of the world's finest art collections is to be found at the Museum of Fine Arts on Huntington Avenue. The Gardner Museum, nearby, known locally as Mrs. Jack Gardner's Palace, has an excellent Renaissance collection.

A trip along Atlantic Avenue will show you Boston's noted waterfront. Here ships tie up with cargoes from all over the world. The busy wharfs, one of which was the scene of the Boston Tea Party, will fascinate you by their picturesque charm. Across the harbor at East Boston, formerly Noddle Island, Donald MacKay built his famous clipper ships, those seagoing greyhounds that made Boston the leading seaport. Right at the water's edge is the East Boston Airport, regarded as one of the most accessible on the eastern coast. A sail among the harbor islands will reveal much to interest the summer visitor.

Music lovers will delight in the unique "Pop" concerts at Symphony Hall, played by a select part of the Boston Symphony Orchestra, whose fame needs no comment. There is nothing in the country quite like these concerts. They are distinctly Boston. The orchestra forsakes its traditional black and white attire for summer flannels and the conventional austerity of the Hall's interior collapses under the informal attack of tinkling wine glasses and curling cigarette smoke.

If you are fortunate enough to stay in Boston during July, you may "take in" the Esplanade Concerts. These are given out-of-doors in the "Shell," by members of the Boston Symphony. The "Pops" conductor, Arthur Fiedler, also leads these musical treats. No more beautiful setting for musical pleasure can be imagined than that provided by the Charles River Esplanade concerts, as the rosy sun goes down behind the white shell and Viennese waltzes echo over the water. These concerts, incidentally, are free and many thousands attend every one of them. The Esplanade itself is well worth a visit. The park

consists of a series of walks and drives along the Charles River Basin, punctuated by a model yacht lagoon. Crews of Harvard and M. I. T. practice on the river, and small launches take passengers for cruises.

Next on your list of places to see around Boston should be fabled Beacon Hill, capped by the gold-domed State House which Bulfinch designed. First Families live in the midst of Bohemia along little side streets and around Louisburg Square. Delightful bits of gay garden bloom behind high board fences and old brick walls protect charming interiors.

All around Boston, and within comfortable distance, are historical and literary points of interest which every person who desires to be considered well-informed must see. Charlestown's Bunker Hill. The Adams homestead in Quincy. Dedham's old Fairbanks House. Cambridge with the homes of Longfellow and Lowell. Somerville with its Powder House where Revolutionists hid their ammunition from the British. Lexington and Concord, always mentioned together, where the Minute Men fired their reverberating shots on April 19, 1775. Sudbury's Wayside Inn and the original little old red schoolhouse where Mary's pet lamb broke the rule.

A trip along the South Shore, through Plymouth and down Cape Cod to Provincetown, will make a pleasant week-end jaunt. The road passes through quiet villages and small industrial centers, borders beach after beach. In Scituate, the "Old Oaken Bucket" is still hanging. Both the well and sweep are also there. Plymouth—the town that everyone wants to visit—is rich with old landmarks, old houses and mementos of antiquity, among them being, of course, Plymouth Rock and Pilgrim Monument. Soon after leaving Colonial Plymouth, you will reach the Cape Cod Canal, which may be crossed by either of two

Fishing Boats, Boston Harbors. Custom House Tower in Background.

(Photograph from the New England Council.)

bridges. At once you will know that you are on the Cape. High sand dunes rise along the water's edge. Wide stretches of seameadow and cranberry bogs extend on either hand. The King's Highway takes you through villages of distinct individual charm—Sandwich, Barnstable, Yarmouth, Dennis, Brewster, Eastham, Truro and finally, Provincetown with its fishing fleet and artists' colonies. Cape Cod is early America almost untouched.

In direct contrast, the North Shore and Cape Ann have, for the most part, bold rocky coast lines that make for unusually beautiful scenery. Palatial estates— summer homes of millionaires—line both sides of the twisting road that traverse's Pride's Crossing, Beverly, Manchester and winds its way to quaint Gloucester.

If you like lush river valleys and rolling hills, you will want to visit Bay State's Connecticut River Valley and the Berkshires. Take the turnpike that passes by Wellesley College campus on to Worcester and Springfield. The latter is a manufacturing city located at the lower end of the valley, formed by the river, that extends almost the whole length of New England. It runs along the boundary between Vermont and New Hampshire, cutting wide through Massachusetts and Connecticut. The river banks form rich farming lands. Fine tobacco leaf for cigar wrappers is the principal crop.

Between the river and New York State are the Berkshire Hills. Some of the best scenery in the country is to be seen in this section, a noted vacation ground. The famous Mohawk Trail through the Berkshires will reveal vast expanses of loveliness. On a clear day, the Green Mountains of Vermont and the White Mountains of New Hampshire are visible from Hairpin Turn on the Trail.

Maine—the largest of the six states—is rightly known as the sportsman's paradise. It offers the hunter and angler an endless variety of game and fish. The beauty of its lakes, among them Moosehead and the Rangeleys, is unsurpassed. Its rugged coastline is world famous. Old Orchard Beach, nearly ten miles long, is the longest beach on the Atlantic coast. Portland overlooks Casco Bay, known for its 365 islands, steeped in Indian legends and pirate lore. Henry Wadsworth Longfellow was born in this city and his boyhood home is now headquarters for the Portland Historical Society. Bangor on the Penobscot River is an important trade center, as well as the gateway to the big woods country. Many small villages and rural farming communities will charm you with their artless simplicity. Mount Katahdin, rising 5,367 feet in the heart of the wilderness, will impress you as being equal to the finest precipices of the Rockies.

New Hampshire is noted as a vacationland principally because of the scenic wonders of its White Mountains, which differ distinctly in general formation from all other ranges in the country. Mountains rise from the very edge of surpassingly beautiful lakes. Unique natural formations, such as the Old Man of the Mountain, Indian Head, the Flume and Lost River —all in Franconia Notch — are unequaled anywhere. The Presidential Range, centering about Mount Washington, is perhaps the best known hiking ground in the world. On New Hampshire's coast, superb sandy beaches alternate

Fairbanks House, Dedham, Massachusetts—Built in 1636.
(Photograph from the New England Council.)

with rocky headlands and deep bays. Inland, the hills are never far from the water, the highest mountains being visible from a long section of the coast. The intervening space is filled with lakes and ponds. This whole region, especially in the northern part, is almost unrivaled for fishing and for canoe trips on winding rivers that broaden continually into lakes.

As great an attraction as are the White Mountains, New Hampshire has still another asset to offer vacationists which makes for an unbeatable combination. Research has proven that the ideal climate for physical health, comfort and activity occurs when the temperature averages from 60 to 67 degrees Fahrenheit, for day and night, together, and when the atmospheric humidity is 80 per cent or more as the average for day and night. Such ideal conditions exist in the United States in but a few places. The White Mountain area is one of them.

Increasing numbers of summer visitors are, each year, attracted to Vermont by the state's "unspoiled" quality. Vermont is a scenic paradise. The Green Mountains, running north and south, traverse the state. Of the peaks, at least 900 are 2,000 feet and more above sea-level. Myriad lakes nestle among them. Excellent motor roads seek out the mountain passes and a fine system of secondary roads reaches every hamlet and town. Vermont offers half-a-hundred splendid golf courses, set in the midst of such beauty that you will be hard put to keep your mind on the little white pill. There are nearly 700 miles of bridle trails throughout the region, with food and lodging accommodations every 10 or 20 miles. Excellent summer and year-round hotels abound.

Although Rhode Island is the smallest state in the Union, it is crammed with facilities for summer pleasure. "Little Rhody" has a shore line of 400 miles with opportunities galore for swimming, diving, boating and sunbathing. Bordering Narragansett Bay are famous summer resorts, the most noted of which is Newport, playground of America's millionaires. The state maintains 1,700 miles of good roads that afford an ever-changing panorama of scenery. Game bird shooting is excellent in western Rhode Island and there are productive fishing waters all though the state. Block Island is famous for deep sea fishing. Rhode Island is rich in historical traditions, industrial endeavor and recreational advantages.

Connecticut — the Nutmeg State — claims many resources that make it an ideal place for vacationing or touring. Although it is the industrial state of New England, Connecticut has much to offer in scenic variety. Fine sandy beaches abound along Long Island Sound. In the western part of the state are the Litchfield Hills, a rolling range of individual masses with frequent small and cup-shaped valleys between them. Old roads thread around and over the hills, twisting from one town to the next. Parts of the Hills are wild and wooded and contain surprisingly large unexploited areas for so picturesque a region. The Litchfields are studded with well stocked lakes and trout brooks. The Connecticut and Naugatuck Rivers flow through pleasantly wide, relaxingly green valleys in the central part of the state, where to see the tobacco plantations alone is worth a trip to Connecticut.

Greatly varied sport facilities are available in Connecticut. Secluded hiking trails wind from boundary to boundary. There are 60 state parks and forests with attractive picnic grounds. Fine-surfaced highways lead everywhere. Connecticut is historically important, too, and the summer visitor will delight in the number of lovely old houses, many of them dating from before the Revolutionary period. All in all, Connecticut possesses a charm and tranquility that you will appreciate.

Vacation information on all New England or on any part of the six states will be gladly sent by the New England Council, Statler Building, Boston, to anyone requesting it.

You are predestined to enjoy your New England vacation. "New England is more than mountain, lake and ocean, golf course and hotel, bathing beach and forest trail. It is a land of ancient memories dear to every American, of landscapes mellowed by three hundred years of human occupation, of villages grown gray and lovely under immemorial elms, of houses proud with the grace of the eighteenth century, and fields where our fathers fought for freedom. New England offers recreation in full variety. But recreation means re-creation of the spirit by its unique and old-world charm, by its rich and beautiful reminders of our national history. Summer or winter, New England has rewards for every visitor."

You will be glad that the American Physiotherapy Association chose Boston and New England for its 1938 convention.

The Physiotherapy Review

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It is with great pleasure that we look forward to our Seventeenth Annual Convention in Boston, Massachusetts. Every chapter should have at least one and as many more representatives there as is possible. It is your convention.

Boston always has played an important part in the development of physical therapy. Doctor Goldthwaite, Doctor Brackett, Doctor Lovett and Doctor Granger were among those who foresaw its value and were responsible for the first training courses.

Our first president, Mary McMillen, from Doctor Brackett's office, gave invaluable service in the organization of the Reconstruction Aides. Now, in China, Miss McMillen is continuing her pioneering in education.

Our first secretary, Janet Merrill, of the Children's Hospital, has played no minor role in the development of physical therapy. She was among that pioneer group from Doctor Lovett's office who rendered a great service to the crippled children of the country. It was through their early efforts that our muscle test and system of muscle re-education had their beginning.

Let us show by our attendance at this convention that we appreciate the faith of these early leaders and the time and effort they expended in our behalf. Each member has a definite responsibility, not only to himself or herself but to the American Physiotherapy Association to take an active part in maintaining and continuing to develop the high ideals and standards of our profession.

Convention Business

Panel of officers submitted by Nominating Committee:

President—Helen Kaiser, Cleveland, Ohio.

First Vice-President—Mrs. Lois B. Young, Toledo, Ohio.

Second Vice-President—Mrs. Margaret W. Cleaveland, Cleveland, Ohio.

Secretary—Mrs. Eloise T. Landis, Cleveland, Ohio.

Treasurer—Mrs. Mary L. Deatherage, Akron, Ohio.

Directors—Constance K. Greene, Boston, Massachusetts; Catherine Worthingham, Palo Alto, California.

Panel is according to amendment to the By-Laws providing for a single ballot. Provision will be made for nominations from the floor at the time of election.

Program of Seventeenth Annual Convention, June 26-30, 1938

Sunday, June 26th

3:00 P. M.—**Registration.**

Informal Tea—Massachusetts Chapter, Hostess.

5:30 P. M.—Leave for Wayside Inn.

Supper and Tour of Inn.

Monday, June 27th

9:00 A. M.—**Address of Welcome**—Robert B. Osgood, M.D., Professor Emeritus, Orthopedic Surgery, Harvard Medical School.

Business Meeting.

2:00 P. M.—Robert Breck Brigham Hospital.

Clinic on Arthritis—John G. Kuhns, M.D., Chief Orthopedic Consultant, Robert Breck Brigham Hospital.

8:00 P. M.—**"Relation of the Fascia Lata to Postural and Other Deformities"**—Frank R. Ober, M.D., John D. and Buckminster Brown Clinical Professor of Orthopedic Surgery, Harvard Medical School.

"Pathology and Its Relationship to Physiotherapy" — Sidney Farber, M.D., Pathologist, Boston Children's Hospital and Associate in Pathology, Harvard Medical School.

Tuesday, June 28th

9:00 A.M.—**"Methods of Treatment for Low Back Pain and Sciatica"**—G. E. Haggart, M.D., Lahey Clinic.

"The Evolution of the Upright Posture"—William T. Green, M.D., Instructor in Orthopedic Surgery, Harvard Medical School, and School of Public Health.

"Treatment of Poliomyelitis"—Mrs. Maude Baum, Baltimore.

2:00 P.M.—**Visit** to Industrial School for Crippled and Deformed Children.

Mr. V. K. Brackett.

History and Tour of the School.

"Crippled Schools and Physical Therapy"—James Warren Sever, M.D., Associate Orthopedic Surgeon, Children's Hospital, Boston; Asst. Prof. of Orthopedic Surgery, Harvard Medical School.

Basket Ball Game.

7:30 P.M.—**Banquet** (formal)—Hotel Somerset, Princess Ballroom.

Toastmaster—James Warren Sever, M.D.

Speaker—Mr. David Mack, Stevens Institute of Technology.

Wednesday, June 29th

9:00 A.M.—**Business Meeting.**

2:00 P.M.—A. P. Aitken, M.D., Boston City Hospital (subject to be announced).

"Peripheral Circulatory Disorders"—Henry H. Faxon, M.D., Massachusetts General Hospital.

8:00 P.M. **Pops.**

Thursday, June 30th

9:00 A.M.—**Children's Hospital.**

Physiotherapy Department (Bader Building)—Janet B. Merrill, Director of Physical Therapy.

Harvard Infantile Paralysis Commission Clinic.

Neurological Unit.

Pool.

P.M.—**Visits** to other institutions.

Sightseeing Trips.

(Arrangements to be made at time of registration.)

Tri-State Hospital Assembly

The Chicago and Wisconsin Chapters participated in the Tri-State (Illinois, Indiana and Wisconsin) Hospital Assembly, May 4, 5 and 6, at the Stevens Hotel, Chicago, Illinois.

The following Sectional programs were presented:

Wednesday, May 4
2:00-4:30 P. M.

Pauline Plummer, Chicago; Department of Physical Therapy, Children's Memorial Hospital, presiding.

Round Table Conference—Economic Value of Physical Therapy. Planning and Construction of the Physical Therapy Department.

The Physical Therapy Department in a 50-bed Hospital.

Discussion led by Howard A. Carter, Chicago; Secretary, Council on Physical Therapy, American Medical Association.

The Economic Value of Physical Therapy.

Discussion led by John S. Coulter, M.D., Chicago; Associate Professor of Physical Therapy, Northwestern University Medical school.

Functional Planning and Construction of the Physical Therapy Department.

Discussion led by William H. Walsh, M.D., Chicago; Hospital Consultant.

Thursday, May 5
2:00-4:30 P. M.

Goldie Grear, Milwaukee; Supervisor, Physical Therapy Department, Milwaukee Hospital, presiding.

The Value of a Physical Therapy Department from the Standpoint of the Doctor, Robert P. Montgomery, M.D., Milwaukee; Orthopedic Surgeon, Associate Staff, Columbia and St. Joseph's Hospitals.

The Value of a Physical Therapy Department from the Standpoint of the Hospital. Herman L. Fritschel, D.D., Milwaukee; Superintendent, Milwaukee Hospital.

The Value of a Physical Therapy Department from the Standpoint of the Out-patient Service. Walter Metzger, Chicago; Assistant Superintendent, Michael Reese Hospital.

Teaching of Physical Therapy in a School of Nursing. Janet Fenimore Korngold, R. N., Chicago; Superintendent of Nurses, St. Luke's Hospital.

General Discussion. Led by John S. Coulter, M.D., Chicago; Associate Professor, Northwestern University Medical School.

At the Conference of Nurses, Miss Jessie L. Stevenson, R. N., Chicago; Supervisor, Orthopedic Division, Visiting Nurse Association of Chicago, gave a demonstration for the Visiting Nurse Association of Chicago on the Home Care of Poliomyelitis.

Miss Mildred Elson, Chicago; Instructor, Physical Therapy, Northwestern University Medical School, who is a member of the Advisory Committee of Services for Crippled Children under the Social Security Act, discussed the Social Security program for the handicapped child from the viewpoint of the physical therapist at the Conference of Medical Social Workers.

International Society for Crippled Children

The Seventeenth Annual Convention was held at the Statler Hotel, Cleveland, Ohio, May 8-11, 1938. The program of physical therapy and occupational therapy was as follows:

Physical Therapy: Miss Janet B. Merrill, Director of Physical Therapeutics, Children's Hospital, Boston, Mass., presiding.

"Physiotherapy in Schools for Crippled Children"—Dr. James Warren Sever, Assistant Professor of Orthopedic Surgery, Harvard Medical School, Boston, Mass.

"Physiotherapy in Schools of Ohio"—Miss Olive Sturdivant, Physical therapist, State Dept. of Education, Columbus, Ohio.

Occupational Therapy: Miss Henrietta McNary, Director, Occupational and Physical Therapy Department, Association for the Crippled and Disabled, Cleveland, Ohio, presiding.

"The Correlation of Occupational Therapy and Physiotherapy"—A film—Miss Marjorie Taylor, Director of the Occupational Therapy Department at Milwaukee-Downer College, Milwaukee, Wisconsin.

"Occupational Therapy for Children from the Point of View of a Neurologist"—Dr. Joseph L. Fetterman, Assistant Neurologist, Western Reserve University Hospitals, Cleveland, Ohio.

Harry H. Howett is returning to the International Society for Crippled Children on or about July 1, after having served as Secretary and Treasurer of the Michigan Crippled Children's Commission.

Western New York Chapter

At the annual meeting of the Western New York Chapter, April 9, the new officers were elected. Following the business meeting and dinner, Dr. Lewis Goldstein from the University of Rochester, Rochester, New York, gave an interesting lecture on "Posture."

Wisconsin Chapter

The February meeting of the Wisconsin Chapter was held in Madison at the Memorial Union and Dr. R. W. West spoke to the group on "Speech Problems of the Crippled Child."

On March 26th, the chapter met in Milwaukee. Dr. David Cleveland of Milwaukee spoke on "General Considerations of Neuro-Physiology and Neuro-Anatomy for Physiotherapy" and the paper was discussed by Dr. W. P. Blount.

Correction

The subtitle of the article "Organizing a Posture Clinic for Children" by Katharine F. Wells which appeared in the March-April issue of THE REVIEW, should read "A Worthwhile Posture Project for Professional Students of Physical Education."

Index to Current Literature

APPARATUS

Apparatus for Infra-Red Therapy (Electro-Medical Apparatus. Part II. No. 2.) L. G. H. SARSFIELD, D. Sc. Brit. J. Phys. Med., Feb. 1938.

Simplified Knee Support. Jour. Chart. Soc. M. & M. Gym., April 1938.

A New Type Walking Iron. H. E. SNYDER, M. D. Jour. A. M. A., April 23, 1938.

ARTHRITIS AND RHEUMATISM

Scapulo-Humeral Periarthritis (Duplay's Disease). A. H. DOUTHWAITE, M. D. Brit. Med. J., Feb. 26, 1938.

Fever Therapy in the Treatment of Acute Rheumatic Fever. F. LOWELL DUNN, M. D. Annals Int. Med., Mar. 1938.

Arthritis: Treatment by Physical Therapy. JOSEPH ECHTMAN, M. D. New York S. Jour. Med., Feb. 1, 1938.

The Organization of a Rheumatism Service. H. L. BACAL, M. D., and R. R. STRUTHERS, M. D. Canad. Med. Assn. Jour., Mar. 1938.

Exercise in the Treatment of Arthritis. Brit. J. Phys. Med., Mar. 1938.

DERMATOLOGY

Finsen Treatment of Lupus Vulgaris of Skin. S. LOMHOLT. Abst. in Jour. A. M. A., Feb. 5, 1938, from Ugesk. f. laeger., Nov. 25, 1937.

Sensitiveness to Light in Certain Dermatoses. J. H. STOKES, AND J. L. CALLAWAY. Arch. Derm. & Syph., Nov. 1937.

The Use of Ultraviolet Ray in the Treatment of Erysipelas. P. M. SCHUNK, M. D. Rocky Mountain Med. J., Mar. 1938.

Lupus Erythematosus: Increased Incidence, Hematoporphyrinuria and Spectroscopic Findings. JOHN B. LUDY, M. D., and EDWARD F. COSGROVE, M. D. Arch. Derm. and Syph., Mar. 1938.

Roentgen and Ultra-Violet Radiation in Dermatology: Use and Limitations. D. E. H. CLEVELAND, M. D., C. M. Canad. Med. Assn. Jour., Dec. 1937.

DIATHERMY

Diathermy in Prostatitis. QUERY AND MINOR NOTE. Jour. A. M. A., Jan. 29, 1938.

Short-Wave Therapy in Gynecology and Obstetrics: Experiences with One Hundred-Twenty Cases. EDWARD G. WATERS, M. D. Am. J. Obst. & Gynec., Jan. 1938.

Diathermy in Subacromial Bursa and Supraspinatus Tendon Calcification. B. S. TROEDSSON, M. D. Arch. P. T., Mar. 1938.

Low Intensity Short Wave Therapy: Some Clinical Results. P. P. DALTON, M. R. C. S., L. R. C. P. Brit. J. Phys. Med., Feb. 1938.

The Use of Artificial Pyrexia in the Treatment of Disease. L. I. M. CASTLEDEN, M. D. Practitioner, Mar. 1938.

The Relative Rise in Temperature of Tissues Heated in the High Frequency Field. H. J. TAYLOR, Ph. D. Brit. Jour. Phys. Med., Mar. 1938.

ELECTROTHERAPY

The Electro-Coagulation Treatment for Inoperable Carcinoma of the Rectum. WARNER F. BOWERS, M. D. Neb. Med. J., Feb. 1938.

Electrosurgery. Editorial, FRANK H. KRUSEN, M. D. Surg., Gynec. & Obst., Feb. 1, 1938.

Electrosurgical Obliteration of the Gall-Bladder Without Drainage. MAX THOREK. Lancet, Jan. 1, 1938.

Electrolysis—Removal of Hair. Jour. A. M. A. Mar. 12, 1938.

Reversed Iontophoresis of Histamine from Human Skin. Its Bearing on Histamine Theory of Allergic Wheal. H. A. ABRAMSON, M. ENGEL, V. LUBKIN, and I. OCHS. Proc. Soc. Exper. Biol. and Med., Feb. 1938.

Bureau of Legal Medicine and Legislation: Removal of Hair by Electrolysis Not the Practice of Medicine. Jour. A. M. A., Mar. 12, 1938.

EXERCISE

Venous Pressure Responses to Exercise. EDWARD S. SCHNEIDER and RAYMOND COLLINS. Amer. Jour. Physiol., Mar. 1938.

EYE

The Modern Surgery of Retinal Detachment. HARRY S. GRADLE, M. D., and SAMUEL J. MEYER, M. D. Surg., Gynec. & Obst., Feb. 15, 1938.

Corneal Ulcers in Childhood. J. H. DOGGART. Clinical Jour., Jan. 1938.

FOOT CONDITIONS

A Nurse's Feet Deserve Good Care. PHILIP LEWIN, M. D. Amer. J. Nurs., April 1938.

FRACTURES

The Organization of Fracture Treatment. Jour. Chart. Soc. M. & M. Gym., April 1938.

The Treatment of Fractures. HARRY PRATT, M. S., F. R. C. S. Jour. Chart. Soc. M. & M. Gym., April 1938.

THE HANDICAPPED CHILD

The Education of Handicapped Children. BESS R. JOHNSON. Pub. Health Nurs., April 1938.

Needs of the Physically Handicapped Child. MARY E. BORTEZ. Pub. Health Nurs., Mar. 1938.

HEAT

The Sinuses as Points of Focal Infection and the Treatment of Sinusitis. DR. WILLIAM FLETCHER. Laryngoscope, Feb. 1938.

HYPERPYREXIA

The Use of Fever Therapy with Children. MURRAY B. FERDERBER, M. D. Penna. M. J., Feb. 1938.

Artificial Fever as an Adjunct in the Treatment of Neurosyphilis. NORMAN N. EPSTEIN, M. D. Arch. Dermat. & Syph., Feb. 1938.

Fever Therapy in the Treatment of Acute Rheumatic Fever. F. LOWELL DUNN, M. D., and E. E. SIMMONS, M. D. Annals of Internal Med., Mar. 1938.

The Effect of Artificial Fever and Specific Antiserum on the Organisms Present in Cases of Type III Pneumococcus Meningitis. MORRIS F. SHAFFER, JOHN F. ENDERS, and JAMES WILSON. Jour. Clin. Invest., Mar. 1938.

Artificial Fever Therapy, A Critical Review. J. MOTT RAWLINGS, M. D. South. Med., Mar. 1938.

LOW BACK CONDITIONS

Some Sacro-Iliac Conditions and Their Treatment. H. JACKSON BURROWS, M. D., F. R. C. S. Clin. Jour., Feb. 1938.

MASSAGE

Present Status of Massage. HANS J. BEHREND, M. D. Arch. P. T., April 1938.

Manipulative Treatment of Intestinal Spasm. J. H. CYRIAX, M. B. Brit. Med. J., Feb. 26, 1838.

MISCELLANEOUS

Examination of Hemoglobin with Infra-Red Photography. A. WEINBACH. Abst. in Jour. A. M. A., Jan. 29, 1938, from Ztschr. f. d. ges. exper. Med., Oct. 20, 1937.

The Management of Insomnia. HENRY COHEN. Practitioner, Feb. 1938.

Transurethral Prostatic Resection: A Report of 101 Operations on 86 Cases. FRANK COLEMAN HAMM. Amer. J. Surg., Jan. 1938.

The Paraffin Bath. MAY PRUGGER. Amer. J. Nurs., April 1938.

Opposition of the Thumb. STERLING BUNNELL, M. D. Jour. B. & J. Surg., April 1938.

Chiropractors Not Authorized to Use Electrical Appliances: Vermont. Jour. A. M. A., Mar. 26, 1938.

Clinical Study of Chronic Prostatitis with Hassett Treatment and Results. JOHN W. FERRIN, M. D. Lancet, Mar. 1938.

Spurs of the Os Calcis. ARTHUR STEINDLER, M. D., and ALBERT R. SMITH, M. D. Surg., Gynec. & Obst., Mar. 1938.

ORTHOPEDIC PROGRAM

The Public Health Nurse and Orthopedic Nursing Care. DOROTHY J. CARTER. Pub. Health Nurs., April 1938.

PERIPHERAL VASCULAR DISEASE

Vascular Accidents of Extremities. GEZA DE TAKATS, M. D. Jour. A. M. A., April 2, 1938.

Passive Vascular Exercise in Treatment of Peripheral Vascular Diseases. GEORGE H. YEAGER, M. D. Arch. P. T., Mar. 1938.

Physiotherapy and Peripheral Circulation. FRANZ NAGELSCHMIDT, M. D. Brit. J. Phys. Med., Feb. 1938.

Treatment of Obliterative Vascular Disease by Intermittent Venous Occlusion. J. J. MASON BROWN, M. B., F. R. C. S. Brit. M. J., Mar. 19, 1938.

PHYSICAL THERAPY

The Relationship of Physical Therapy to Internal Medicine. JACOB GUTMAN, M. D. New York State J. Med., Mar. 15, 1938.

Some Facts and Comments on Physical Therapy: A Review of the Literature. AARON STOLINSKY. Jour. Lancet, Jan. 1938.

Physical Therapy in Peripheral Vascular Disease. IRVING SHERWOOD WRIGHT, M. D. Arch. P. T., Mar. 1938.

POLIOMYELITIS

Treatment of Infantile Paralysis. Jour. Char. Soc. M. & M. Gym., Mar. 1938.

The Kenny Treatment of Anterior Poliomyelitis. Jour. Char. Soc. M. & M. Gym., Mar. 1938.

Chemoprophylaxis in Poliomyelitis. LEE SHAHINIAN, M. D.; J. A. BACKER, M. D.; R. C. MCNAUGHT, M. D., and R. R. NEWELL, M. D. Jour. A. M. A., April 16, 1938.

The Essential Features of Poliomyelitis. Part I—The Acute Stage. T. CAMPBELL THOMPSON, M. D. Pub. Health Nurs., Mar. 1938.

The Essential Features of Poliomyelitis. Part II—The Convalescent Stage. T. CAMPBELL THOMPSON, M. D. Pub. Health Nurs., April 1938.

An Operation to Improve Function in Quadriceps Paralysis. CARL C. YOUNT, M. D. Jour. B. & J. Surg., April 1938.

REHABILITATION

The Rehabilitation of Injured Workers. FREDERIC G. ELTON. Rehabilitation Rev., Nov.-Dec. 1937.

The Relation of Sheltered Workshops to the Federal-States Rehabilitation Program. JOHN AUBEL KRATZ. Rehabilitation Rev., Dec. 1937.

RICKETS

Failure of Abundant Sunshine to Protect Against Rickets. C. U. MOORE; JESSIE LAIRD BRODIE; A. J. THORNTON; A. M. LESEM, and OLIVE B. CORDUA. Amer. J. Dis. Child., Dec. 1937.

The Treatment of Renal Rickets. GEORGE GRAHAM, M. D., and W. G. OAKLEY, M. D. Arch. Dis. Child., Mar. 1938.

SCOLIOSIS

Correction of Scoliosis by a Distractor Apparatus. JOHN DONALDSON, M. D., and O. ANDERSON ENGH, M. D. Jour. B. & J. Surg., April 1938.

SERVICES FOR CRIPPLED CHILDREN

Services in Cleveland, Ohio, for the Crippled and Disabled. BELL GREVE. The Crippled Child, April 1938.

SPASTIC PARALYSIS

The Care of Cerebral Palsies. WINTHROP MORGAN PHELPS, M. D. The Crippled Child, April 1938.

The Spastic in Our Schools. MARION STRAUSS. The Crippled Child, April 1938.

The Treatment of Cerebral Palsies from the Functional Viewpoint. WINTHROP MORGAN PHELPS, M. D. Occup. Therapy and Rehabilitation, April 1938.

Occupational Therapy as a Treatment for Spastics. JANE MYERS, O. T. Reg. Occup. Therapy and Rehabilitation, April 1938.

The Project for the Treatment of Cerebral Palsy at the Riley Hospital. WINIFRED CONRICK KAHMANN, O. T. Reg. Occup. Therapy and Rehabilitation, April 1938.

Project for Treatment of Cerebral Palsy. MARGARET S. ROOD. Occup. Therapy and Rehabilitation, April 1938.

SPRAINS

The Treatment of Joint Sprains and Strains. R. C. ELMSLIE, M. S., F. R. C. S. Brit. Med. Jour., Mar. 5, 1938.

TUBERCULOSIS

Uveal Tuberculosis. GEORGE P. MEYER, M. D. Jour. Med. Soc. of N. J., Mar. 1938.

Pelvic Tuberculosis. JAMES E. KING, M. D. Amer. Jour. Obst. and Gynec., Mar. 1938.

The Diagnosis and Treatment of Tuberculous Tracheobronchitis. WADSWORTH WARREN; ARTHUR E. HAMMOND and WILLIAM M. TUTTLE. Amer. Rev. Tuber., Mar. 1938.

ULTRAVIOLET RADIATION

Failure of Abundant Sunshine to Protect Against Rickets. C. U. MOORE, JESSIE LAIRD BRODIE, A. J. THORNTON, A. M. LESEM, and OLIVE B. CORDUA. Amer. J. Dis. Child., Dec. 1937.

Ultraviolet Irradiation in Secondary Anemia. R. KOVACS. Arch. P. T., Dec. 1937.

Deprivation of Sunlight as a Possible Factor in War Dropsy—Prison Edema. CAPTAIN W. L. MANN. Military Surg., Jan. 1938.

The Use of Ultraviolet Ray in the Treatment of Erysipelas. P. M. SCHUNK, M. D. Rocky Mountain Med. Jour., Mar. 1938.

Roentgen and Ultra-violet Radiation in Dermatology: Use and Limitations. D. E. H. CLEVELAND, M. D., C. M. Canad. Med. Assn. Jour., Dec. 1937.

ABSTRACTS

John S. Coulter, M. D.

Relief of Neuritic Pain by Artificial Fever Therapy

A. E. Bennett, M. D., and Paul T. Cash, M. D., Omaha. Arch. Phys. Therapy 19:2:69, February 1938.

Conclusions

The prompt and striking relief obtained in the majority of patients having a large variety of toxic, infectious neuritic and radicular neurologic disorders by artificial fever therapy offers decided aid in alleviating these states. We have not seen such universally favorable response from other therapeutic agents.

The physiologic mechanism of general fever induction affecting relief of neuritic pain is not well understood. Undoubtedly the enhanced blood flow and peripheral vasodilatation in the inflamed areas increase tissue oxidation and nutrition. Leucocytosis, phagocytosis, and mobilization of immune bodies secondary to induced fever play a part in the absorption of rheumatic deposits, dilution of toxins and the healing of inflamed nerve tissues.

While we have seen evidence of shortened convalescence in severe polyneuritis, improvement in the blood picture, gain in weight and strength, we cannot definitely attribute these changes to fever therapy. We believe, however, that its use in relieving neuritic pain is a valuable aid in treatment along with other therapeutic agents. These treatments are very well tolerated and usually welcomed by the patient since his pain disappears as soon as the body temperature is elevated. The treatments do not interfere with any other indicated therapy and are practically without danger in experienced hands.

Summary

We have presented extensive clinical evidence that artificial hyperpyrexia is a valuable therapeutic aid in relieving painful neuritic, meningitic and radicular states. These treatments are given at lower temperature levels, 103 to 105 F., for two to four hours each, two to six treatments.

All types of neuritic pain are relieved immediately but pain recurs in some cases, especially in the secondary neuritides from compressive lesions. This form of heat therapy is a distinct advance over all local forms of heat in relieving pain.

Fever therapy is not recommended to replace other accepted forms of therapy in neuritis, but only as an aid in the management. It probably hastens convalescence in the severe toxic infectious polyneuritic states.

In 20 cases of sciatic neuritis, pain was relieved in 80 per cent by combined fever therapy and epidural injections. Those not relieved, or 20 per cent, were of the compressive types.

In 6 cases of brachial neuritis 50 per cent were relieved of pain and muscle and joint stiffness by fever therapy alone.

In 4 cases of toxic infectious polyneuritis and one case of infective neuronitis, all suffering severe neuritic or radicular pain, complete relief of pain and hyperesthesias followed fever therapy. The general condition of the patients improved and convalescence seemed hastened. Vigorous vitamin therapy also was used in these cases.

In 3 cases of herpes zoster with severe radiculitis in elderly people (over 60 years), complete, prompt relief from pain occurred in all after from 2 to 3 fever treatments.

In 2 cases of benign lymphocytic meningitis artificial fever therapy seemed to give striking relief from meningitic and radicular symptoms. The general condition of the patients was benefited by the therapy and improvement in pathologic spinal fluid findings occurred after each fever session.

In 4 cases of arthritic disease with secondary neuritic or neuralgic states, marked relief of pain was obtained.

We recommend physical fever therapy as a safe, efficient means of relieving all types of neuritic and radicular painful affections. Its use should be limited to institutions completely equipped and with a trained personnel familiar with its potential dangers.

Treatment of Acute Poliomyelitis

An Analysis of Sister Kenny's Methods

F. H. Mills, M.B., B.S., Formerly Tutor in Medicine, St. Andrew's College, University of Sydney. In British Medical Journal, 4020:168, January 22, 1938.

The accepted or orthodox methods of treatment may be summarized as follows:

(a) Rest and immobilization of the affected limbs until the stage of pain or irritation is past.

(b) Maintenance of affected muscles in a position of relaxation.

(c) Avoidance of contractures and deformities by light retentive apparatus.

(d) Massage and active and passive movements.

Treatment along these lines is based upon the theory that the pain in the limbs is of central or meningeal origin, and that rest and immobilization will remove the harmful afferent stimuli and enable reparative changes to take place in the cord. The stage of irritation or painful period lasts on an average six weeks and may be prolonged for three to six months. Immobilization and rest during the whole of this stage is not considered detrimental by many authorities.

In opposition to this accepted theory the view is taken that the pain in the extremities is almost completely vascular in origin. Some of the pain may be of central origin, but this takes the form of spontaneous or root pain and is not aggravated by movement. The muscular pain results from venous engorgement and consequent anoxia of the paralyzed muscles. The venous return from the extremities is influenced mainly by muscle tone and activity. In poliomyelitis the interference with this venous return is often of extreme degree. At first there is venous stasis, and later on capillary stasis and capillary paralysis; this is manifested by the coldness and cyanotic appearance of the limb and is accentuated by immobilization and splinting, especially in the position often adopted—that is, abduction of the upper or lower limb. As a result mild trophic changes develop in the skin, bones, joints, fascia, and especially in the muscles. Immobilization of paralyzed limbs, with consequent vascular catastrophe, leads to contraction of the muscle sheath and anemia of muscle fibres, with subsequent mild fibrosis—seemingly a clinical entity, comparable to a very mild Volkmann's ischemic contracture. Brooks has demonstrated the fact that complete obstruction to the venous return from a muscle leads in a few hours to profound muscle changes and is the causative factor in Volkmann's paralysis. A parallel may be drawn between the etiology of the two conditions. The importance of this ischemic pseudo-paralysis is recognized when it is understood that it renders muscle reeducation extremely difficult. It is accentuated both by stretching and relaxation of muscles, as in the position of relaxation the muscle sheath contracts, tending to cause a permanent shortening of the length of the fibres and often resulting in slight deformities.

The irritation stage is an artificial stage which may invariably be overcome in two or three days by a well-regulated system of frequent passive movement, fomentation, and hydrotherapy. In no case does pain persist more than three days, although it usually will recur in the early mornings after the limb has been rested during the night. Cutaneous hyperesthesia also disappears under the treatment. As soon as the temperature drops, the active phase of reeducation is started—that is, reeducation is begun within one week of the onset of paralysis instead of after six or more weeks. In those cases in which a slight rise of temperature persists, treatment is carried out in spite of the pyrexia.

Massage has little part in the restoration of circulation, to which all efforts must be directed. By massage the blood is merely squeezed from one set of dilated capillaries to another. Only some method by which capillary tone can be reestablished is effective (see Sampson Wright, 1936, Applied Physiology). Such a method is a system of hydrotherapy which makes use of the rapid alternation of hot and cold sprays in the bath. The limbs become suffused with a pink color within ten minutes, the areas last to lose their cyanotic appearance being those which overlie the paralyzed muscle groups. By this simple measure applied daily trophic changes are avoided and the later application of such operative procedures as sympathetic ramisection rendered unnecessary.

Briefly, instead of being dealt with by rest and immobilization in the acute stage, the affected limbs must be treated energetically, by foments, by hydrotherapy, and by movement through every range of each joint every two hours, and a finely graded system of reeducation must be started as soon as possible, usually within the first week of paralytic manifestations. Under such a regime, wasting

of paralyzed muscles occurs only to a small degree.

As soon as the temperature falls, the active phase of the treatment is begun and may be summarized thus:

(a) The individual treatment of the patient and maintenance of a cheerful mental outlook.
(b) Special form of hydrotherapy.
(c) Maintenance of impulse.
(d) Avoidance of fatigue.
(e) Avoidance of immobilization.

This active phase is instituted with extreme care, because it must be remembered that most of the residual anterior horn cells are still in a state of cloudy swelling. The patient must be treated alone because it is of major importance that the whole attention should be concentrated on the treatment and not diverted elsewhere. Above all, an atmosphere of confidence must be maintained. The patients are placed upon a canvas sheet, lowered into the bath and given the form of hydrotherapy previously described. The joints are moved passively every two hours, and on only one occasion each day is an active attempt at movement of the affected muscles made. If a limb shows extensive paralysis only one muscle group is exercised at a time, the other muscle groups being exercised at later intervals in the day. The active attempt at movement involves a special reeducative technique and is carried out as follows:

The limb is grasped firmly just below the insertion of the paralyzed muscle or muscle group, and the patient is asked to make the movement. Special grips are used to prevent accessory or trick movements. The patient focuses all his attention on the affected muscle and the attendant slowly performs the movement passively. Within a few days a trained assistant will detect a faint change in the affected muscle. It can be detected long before the finest movement is noticeable; it represents the first stage in the return of tone (subliminal excitation) in the muscle, and is termed "the impulse."

Treatment of Pelvic Inflammations by Hyperpyrexia

A. V. Pettit, San Francisco. Abstract in J. A. M. A. 110:5:401 (Jan. 29) 1938, from West. J. Surg. 45:637, Dec. 1937.

Pettit employed short hyperpyrexia treatments in the troublesome group of gynecologic patients in which there are disabling inflammatory lesions of the pelvic organs without a known specific bacterial agent. The group is made up largely of patients in whom the infectious foci suggests an original gonorrheal origin and are notoriously difficult to relieve without resorting to destructive surgery. The symptom common to this group is pain which is caused by infiltration of the pelvic visceral connective tissue and the swelling of fixed and adherent viscera. The patient lies in a continuous water bath on a canvas hammock with the head supported comfortably on a rubber air pillow. The bath is begun at a temperature of 105 F. and is gradually raised from 3 to 5 degrees during the next thirty minutes. The patient is then removed and wrapped well in hot woolen blankets surrounded by a rubber sheet. The temperature, which is thus held at a high point for from two to four hours following the removal from the tub, falls rapidly after unwrapping. Preliminary preparation consists only in omitting breakfast and giving an enema. The clinical material in the report is compiled from the records of patients in the Stanford Gynecological Wards of Lane and San Francisco hospitals. All private cases were eliminated, as were the clinic cases with inadequate follow-up. Therefore, of the 244 patients with a total of 840 treatments, there remains for study 150 clinical histories with a total of 510 fever baths. The average hyperpyrexia treatments per patients was 3.4. The length of follow-up examination averaged a little more than six months and the time required for cure varied between one week and two months, with an average time of five weeks.

Gravity Pressure and Circulating Hot Water Method of Applying Heat to the Pelvic Tissues

Phillips K. Champion, M.D., New Orleans, La., and Charles A. Dwyer, Jr., Houston, Tex. (From the Department of Gynecology, Louisiana State University Medical Center and State Charity Hospital.) In Surgery, 2:4:612, October 1937.

Following the introduction of the Elliot treatment to the medical profession in 1920 by Charles Robert Elliot, there have been many confirmatory reports extolling the value of applying heat to the pelvis in inflammatory conditions. This knowledge of the beneficial effect of heat in treating inflammations including pelvic inflammation dates back to Hippocrates, 450 B. C. We shall not attempt to trace its evolution through the ages, merely pointing out that Galen and Celsus were aware

of the value of this type of therapy in the first centuries of the Christian era, while Emmett, in the nineteenth century, was a warm advocate of the treatment of pelvic inflammation by hot vaginal douches. Frank F. Simpson and H. S. Crossen in 1909 published almost simultaneously reports on the conservative treatment of acute gonorrheal salpingitis and demonstrated conclusively the advantage over radical surgery. Curtis' studies of the short life of the gonococcus in the pelvic tissue as shown by tissue cultures helped to further prove the rationale of conservative therapy.

Believing that a simple device of minimal cost that would convey heat to the pelvic tissue was needed, we devised this apparatus which can be assembled in a few minutes and which does not require an experienced operator.

The apparatus consists of the following:

One or two gallon irrigating jar.
Rubber tubing.
Glass tubing.
One pinchcock.
Two-hole stopper.
Fifteen gauge needle.
Infusion adapter.
Mercury thermometer.
Rubber balloons.

Conclusions

1. The advantages of this method are the low cost, simplicity of operation, effectiveness in maintaining a high temperature to the pelvic tissue, and its freedom from producing injurious results.

2. This method is ideally suited in pelvic inflammations where the pathology is in fairly close proximity to the vaginal mucous membranes.

3. Its low cost and effectiveness will make it a valuable adjunct to any gynecological ward.

Treatment of Peripheral Vascular Disease by a Suction-Pressure Chamber Applied to the Thigh

Emile Holman, M.D., and T. L. Schulte, M.D., San Francisco, Calif. (From the Department of Surgery, Stanford University Medical School.) In Surgery, 2:4:502, October 1937.

Discussion

The suction-pressure chamber applied to the thigh has definite advantages:

1. It exerts its influence on vessels which are still patent and pliable instead of upon an obliterated or practically obliterated arterial bed. The former vessels are capable of responding to external influence, whereas, the latter may not be.

2. It can be applied in the presence of infection upon the foot without danger of spreading such infection by active massage. The healing of indolent, previously recalcitrant ulcers has been achieved under its treatment.

3. It is applicable when the Pavaex boot cannot be used due to the unbearable pain produced by the active massage of inflamed tissues.

4. The thigh chamber proved its effectiveness in a case previously treated without benefit by the Pavaex boot.

5. It is applicable in obliterative vascular disease whether due to thromboangiitis or to arteriosclerosis.

6. The thigh chamber is in reality a peripheral or accessory "heart." During the negative pressure phase, it draws blood into the thigh; and during the positive phase, it forces this blood into the peripheral vessels. Its action is comparable with that of a "booster pump."

Physical Therapy in Peripheral Vascular Disease

Irving S. Wright, M.D., (New York). In the Archives of Physical Therapy, XIX:3:162, March 1938.

Employment of Simpler Agents

There are many patients who cannot stand the pain incident to this treatment. In order to justify the use of an elaborate equipment, such as this, it must be demonstrated that similar results cannot be obtained by simpler methods. Time alone will answer this question.

A new apparatus introduced by Collens and Wilensky, which operates on the principle of an intermittent venous hyperemia, has been reported as producing encouraging results in the hands of the originators but needs further observation for general use.

Iontophoresis with acetyl-beta-methylcholine chloride, as reported from our clinic, seems to be of at least temporary value in the treatment of Raynaud's disease and scleroderma, and I believe is of proved value in the treatment of chronic varicose and post-phlebitic ulcers. A word of warning regarding the possibility of burns through this form of treatment. If the asbestos material is not completely intact, it is possible to cause a severe and prolonged burn.

The technic described by J. Kovacs should be followed in minute detail in order to protect the patient.

Since wet dressings and baths are widely used in the treatment of these gangrenous conditions, it is desirable that they should be maintained at a temperature which is not above 98 F. and does not fall below 90 F. It has been frequently observed that wet dressings in most hospitals soon become cold and produce a definite spasm of the small vessels, locally, thus inhibiting the circulation and healing.

The use of the ordinary cradle and lamp combination, on the other hand, frequently results in an elevation of temperature too high to be safe and again we are confronted with the problem of increased metabolic demands upon the potential blood supply. Starr has demonstrated the need for thermostatically controlled heat. This can be obtained by either a thermostatically controlled cradle or lamp, or, less satisfactorily, by a thermometer in the cradle, by which an ordinary light bulb can be regulated. The temperature should be maintained between 90 and 95 F. to secure the best results. A wet dressing in a cradle so controlled usually will be maintained at a satisfactory temperature.

Encouraging results in the treatment of peripheral vascular disease have been reported following the use of various types of apparatus to increase the body temperature as a whole, as, for example, the Kettering hypertherm. Insufficient work has been done thus far with these machines to prove that they have a therapeutic efficiency greater than can be obtained by the intravenous administration of typhoid vaccine.

It is obviously impossible to include in this discussion all of the methods of physical therapy which have been used in the treatment of peripheral vascular disease. I have, however, endeavored to stress those of major importance, emphasizing particularly the need for a more careful and critical approach.

Some Diseases of the Peripheral Arteries

Edgar V. Allen, M.D., F.A.C.P., Rochester, Minn. In The Journal-Lancet, LVIII:2:80, February 1938.

Measures to Increase the Circulation. Local application of heat is advisable and may be in the form of radiant heat from carbon filament bulbs placed in a cradle or baker. The temperature about the feet should not exceed 105 F. Exposure to this warmth for an hour two or three times a day is advisable. Warm sitz baths, using water as warm as can be tolerated comfortably, may be used for periods of ten to twenty minutes one to three times each day. Electric pads or hot water bottles never should be applied directly to the skin. Postural exercises may be helpful. The patient should elevate the extremities for one minute, then place them in the dependent position until the rubor becomes maximal, then lie with them in a horizontal position for one minute. These procedures should be repeated five times, two or three times a day. Contrast baths may be advisable. There should be two containers, each large enough to immerse both feet to the mid-leg. In one container is placed cold water from 40 to 50 F. and in the other, warm water from 102 to 105 F. The feet are alternately immersed in the water in each container for one minute during a period of about fifteen minutes. This procedure can be repeated two or three times a day. In some instances intermittent suction and pressure (pavex) treatment should be carried out for two or three hours daily. The pressures should be varied depending on the comfort of the treatment and the effects on circulation, but ordinarily a positive pressure of 40 mm. of mercury and a negative pressure of 80 to 100 mm. of mercury are advisable. A complete cycle usually should occupy about fifteen seconds. Some physicians believe that this method of treatment is valueless but it is worth a trial in most cases. Intermittent venous obstruction is considered advisable by some physicians. While machines are available which perform this treatment automatically, it can be carried out by placing the cuff of a sphygmomanometer about the thigh or arm. The cuff is inflated to a pressure of about 80 mm. of mercury for two minutes and then deflated for two minutes. This treatment should be carried out for a minimum of four or five hours daily.

Council on Physical Therapy

The Council on Physical Therapy has authorized publication on the following article. (Howard A. Carter, Secretary.) In The Journal of the American Medical Association, 110:12:897, March 19, 1938.

Physical Therapy Departments in Hospitals with Fifty or More Beds

With these figures in hand, the exact move will be to choose the right personnel. All the

ingenuity and planning that go into creating the mechanical set-up will be wasted without a properly trained director in control. This physician, in addition to ground work in medicine and surgery, should have taken a post-graduate course in physical therapy.

The guiding hand of the director will count for nothing without the proper technical personnel. Choice of the right technician will ensure correct application of the prescribed treatments. The head technician of a department should be a graduate of an approved school for physical therapy technicians and be registered with the American Registry for Physical Therapy Technicians.

When the cooperation of the staff is assured and the proper personnel is at hand, it is time to decide on a location for the department. Unfortunately, the ideal arrangement of rooms cannot be added to old hospitals in which all available space probably is utilized. Consequently, many departments have been placed in basements. It seems timely to advise against this.

The best location is on the first or ground floor. This will enable out-patients to receive treatment without going through the hospital corridors. Many of these outpatients are crippled and unable to ascend stairs. It is particularly important to have the rooms well ventilated and well lighted, because fresh air is vital where exercises are to be given.

Minimum requirements in equipment will consist of apparatus which can be made by the hospital carpenter and electrician, it being kept in mind that heat can be administered with wide success without much apparatus. The units decided on should be readily movable; i. e., on casters, or portable:

Two home-made bakers: one for local applications (14½ inches high by 17 inches long by 14 inches wide, containing approximately four 60-watt bulbs); one for body applications (24 inches high by 30 inches long by 22 inches wide, containing approximately eight 60-watt bulbs).

One paraffin bath: 1¼ gallon double boiler; electric or gas stove; 8 pounds of paraffin.

One tank for underwater exercise.

Exercise apparatus.

If funds are available, the two following lamps may be used in place of bakers:

Tungsten 1,000-watt lamp (for "near infra-red," where deeper penetration over large body area is desired—from 10 to 30 mm., according to Coblentz).

Small, nonluminous infra-red lamp (for "far infra-red" applications to local areas, more superficial absorption—from 3 to 0.1 mm., according to Coblentz).

Other physical measures, such as massage, exercises, hot compresses and cold packs, may be supplied by the technician. If circumstances warrant, and only when warranted, the following equipment may be added:

One portable diathermy unit for medical and surgical use.

One ultraviolet mercury arc lamp.

One galvanic-sinusoidal outfit.

Bell's Palsy

K. G. Hansson, New York, N. Y. Med. Record, 148:3:120, Feb. 2, 1938.

Treatment

This consists in the immediate treatment and the after-treatment. The immediate treatment should include a reassurance that the paralysis is not permanent and emphasis on rest—both general and local. By local rest we mean the prevention of overstretching of the paralyzed muscles especially the muscles of the lower half of the face. This can be done by adhesive strapping or a padded hook that can be inserted into the corner of the mouth and held by an elastic over the ear. This is as important as the splinting we use in the treatment of a wrist drop or a foot drop.

Some protection of the eye is also recommended. It is wise to wear dark glasses in daytime, introduce a few drops of boric acid into the eye three times a day and bandage the eyelid closed during the night. Except for gentle heat to the affected side of the face no treatment should be attempted until the tenth day. At this time an electrodiagnosis should be made, using both the faradic and the interrupted galvanic currents. On the basis of the electrodiagnosis a rather definite prognosis can be given. We can distinguish three variations in the electrodiagnosis. If there is good reaction to both currents—which means no reaction of degeneration—the paralysis will recover within six to eight weeks; if the reaction to faradic current is questionable and the reaction to the galvanic is good, the recovery will take two to three months; and when there is complete reaction of degeneration, the patient will not recover within three months and it may take a year.

The after-treatment consists of the application of heat—infrared heat preferably—to

the affected side for about ten minutes, followed by stimulation of the affected muscles by the interrupted galvanic current. This is best done by the unipolar method; that is, the positive electrode under the patient's hand and a small negative electrode over the motor points of the affected muscles. Care should be used so that the muscles are not overstimulated. Gentle massage of the affected side of the face will help to maintain the tone of the muscles. The patient is also instructed in exercises before a mirror in an effort to wrinkle the forehead, close the eyes tight, smile, whistle and blow. These treatments should be repeated at least every other day until full recovery has been reached. Home treatment should consist of gentle massage and the above-mentioned exercises twice a day.

Treatment in Some Chronic Pulmonary Diseases

Brian Taylor, M.D. Birm., M.R.C.P. Lond., Physician for Out-Patients, Queens' Hospital, Birmingham. In The Clinical Journal, LXVII:2:52, February 1938.

Prevention of asthma is all important when possible. Unfortunately the appropriate dust, feather, hairs or what-not rarely can be found. If the specific excitor is discovered it may be possible to remove it from the patient or vice versa. Another method, but less successful is to try and desensitize the patient by injections of the specific antigen.

In general I would stress the value of breathing exercises, properly carried out as in the massage departments of our big hospitals. Especially are these needed in younger patients and in the early stages of the complaint before a rigid, deformed, emphysematous chest develops. Here again a diet may be demanded, but there are few safe rules. Prevent the patient over-eating and provide sufficient vegetable and salad ingredients which help bowel action. The skin tests occasionally show the patient sensitive to some special foodstuff, but in my experience this is rare, and even then its removal may not stop the attacks. The spas are often helpful and should not be overlooked for those patients who can go.

Bronchial Asthma

A. R. Foss, M. D., F. A. C. P., Missoula, Montana. In The Journal-Lancet, LVIII; 2:60, February 1938.

Climatic changes are beneficial to those cases that have a preponderance of infection and especially if there is much pulmonary change. In the case of younger people they should always have the benefit of a thorough allergic study before changing of residence is considered. In young people the infection often clears up remarkably after clearing up the allergic factors. If climatic change is considered, the Southwestern states are preferable, particularly Arizona, because of the low relative humidity and the relatively even temperature.

Air-conditioning of homes is a very definite step toward securing a dust-free home atmosphere and undoubtedly will be a great relief to many asthmatic patients.

Deep-breathing exercises have been advocated by some European physicians. Livingstone and Gillespie have reported a definite improvement in 52 out of 75 patients treated by ten minute exercises wherein the patient takes short inspirations through the nose and follows with long expirations through the mouth.

Book Reviews

BIOLOGICAL AND CLINICAL CHEMISTRY. By Matthew Steel, Ph.D., Professor of Biochemistry in Long Island College of Medicine, Brooklyn, New York. Cloth. Price, $8.00. *Pp.* 770. *Philadelphia: Lea & Febiger,* 1937.

This is a textbook of biochemistry in medicine—divided into five parts. Part one considers the chemistry of the organic constituents of the cell, proteins, fats and carbohydrates. The physical-chemistry and biophysics of cells and tissues are presented in part two. The next section is devoted to the catalyzers of vital phenomena, enzymes, vitamins and hormones. All phases of nutrition, metabolism and growth are controlled by catalysts, hence this is one of the most interesting fields of biochemistry. The chemistry and function of the blood, hemoglobin and lymph, the biophysics of blood and the quantitative chemical analysis of blood in health and disease are the topics discussed in the fourth section. Nutrition, metabolism and clinical chemistry are also studied in this part.

It is a good textbook on biological and clinical chemistry.

PHYSICAL THERAPY IN ARTHRITIS. By Frank Hammond Krusen, M. D., Associate Professor of Physical Medicine, the Mayo Foundation, University of Minnesota. Foreword by Melvin S. Henderson. Cloth. Price, $2.25. Pp. 180, with 21 illustrations. New York: Paul B. Hoeber, Inc., 1937.

This small volume covers very completely the use of physical agents in chronic arthritis. The illustrations are excellent. In no other disease has physical therapy a greater application than in arthritis. In fact, without physical therapy, few advanced arthritics can expect to recover. All physical agents are powerful tools and in chronic arthritis they must be used conservatively or they will "add insult to injury."

This book shows the general practitioner and the physical therapy technician that physical therapy can be used without expensive apparatus, and that the majority of physical measures used in the treatment of arthritis may, with a little thought and effort, be applied quite readily in the patient's own home.

It can be recommended highly to those treating arthritis, because it contains methods of applying physical agents at home for that vast number of arthritics who are unable to continue hospital care as long as they should.

IN THE NAME OF COMMON SENSE: WORRY AND ITS CONTROL. By Matthew N. Chappell, Ph. D. Cloth. Price, $1.75. Pp. 192. New York: The Macmillan Company, 1938.

This book is an attempt to present a phase of mental hygiene to the layman in a simple, practical message. Recognizing that worry is a human experience common to the average individual, the author emphasizes the need for a healthy understanding of this emotional state. There are "good" worriers and "bad" worriers. Good worriers are able to make a satisfactory adjustment to their everyday problems although forced to carry stresses and strains upon their shoulders. Bad worriers, on the other hand, as a result of their intense anxiety and associated fears are unable to do this satisfactorily. It is in this group that neurotic behavior becomes manifested. "In the Name of Common Sense" may find an appeal for the lay mind by virtue of its simplicity and its humor. The book offers nothing to those interested in the psychoses.

J. B. MURPHY, STORMY PETREL OF SURGERY. By Loyal Davis, M. D., M. S., Ph. D., Professor of Surgery and Chairman of the Division of Surgery in Northwestern University Medical School. Cloth. Price, $3.00. Pp. 311. New York: G. P. Putnam's Sons, 1938.

John Benjamin Murphy (1857-1916) is rated by the historian Garrison as "unquestionably the most effective teacher of his subject in the West." He did epoch-making work in intestinal anastomosis with the Murphy button; in 1897 he introduced end-to-end suture of blood vessels by means of invagination; he introduced into America the treatment of phthisis by artificial pneumothorax in 1898, and had remarkable results with bone-grafts.

"J.B." began his life in a frontier log cabin in Wisconsin and became one of the world's best known surgeons. This book traces his life from this humble start, tells of earning his way through medical school, his graduate work in Europe, and then through his long years of surgical practice, research and teaching in Chicago.

Because he was criticized by his fellows in the medical profession, his character might be idealized to make it appear heroic; essential traits might be discreetly veiled to win admiration for his logical position in surgery, but Davis in this book has allowed the work and life of Murphy to speak for him. It can be highly recommended as a unique biography of a fascinating personality.

NOT SO LONG AGO. A CHRONICLE OF MEDICINE AND DOCTORS IN COLONIAL PHILADELPHIA. By Cecil K. Drinker, M. D., Sc. D., Professor of Physiology and Dean of the School of Public Health, Harvard University. Cloth. Price, $3.50. Pp. 183, with 20 illustrations. New York: Oxford University Press, 1937.

The diary of the author's great-great-grandmother, Elizabeth Drinker of Philadelphia, forms the basis for this interesting volume. She kept a diary from 1758 until a few days before her death in 1807. As the family was well-to-do, the physicians whom they met were the best in the colonies. There are intimate pictures of such men as Benjamin Rush, Dr. William Shippen, Jr., Dr. John Redman, Dr. Adam Kuhn, Dr. Philip Syng Physick and Dr. John Fothergill.

There are items of particular interest to

physical therapists, such as the description of a copy of a paper by Benjamin Rush entitled "Experiments and Observations on the Mineral Waters of Philadelphia, Abington, and Bristol, Pa." This paper is an account of the medicinal qualities of a number of natural springs. One of these springs was from a well which was described as having a slight faetid smell. On the margin of the paper is a note, written in 1773 by the first owner of the pamphlet: "The water lost its virtue within a few months after investigation owing to the contents of a neighboring necessary. The well being exhausted on account of the quantity drunk it was found that the well communicated with the necessary which gave the smell and sediment."

In 1803 the Drinkers became possessed of what must have been unusual—a bathtub—which they frequently lent to neighbors who had illness in their homes. Bathing in a tub was not only difficult but until about 1850 during the winter months was thought actually dangerous. Shortly after 1835 the common council of Philadelphia tried to pass an ordinance prohibiting tub bathing between November first and March fifteenth.

It is an interesting book that can be recommended to those interested in the medical history and daily life of the people of Philadelphia in this period.

MACLEOD'S PHYSIOLOGY IN MODERN MEDICINE. Edited by Philip Bard, Professor of Physiology, Johns Hopkins University School of Medicine. Cloth. Price, $8.50. *Pp.* 1100, *with* 350 *illustrations. St. Louis: C. V. Mosby Co.,* 1937.

This is the eighth edition of a well-known textbook of physiology. The senior author has recruited many leading authorities on special subjects relating to the clinical application of physiology and biochemistry in order to keep the material up to date. Several of the chapters have been rewritten and of special excellence are those on the neuro-muscular and central nervous systems and on circulation. Other parts of the book deal with the endocrine glands, the alimentary tract and the respiratory system. A chapter on water balance is particularly timely in view of much recent research on the regulation and disturbance of tissue fluids.

The book is exceedingly well written and will be understood by students and physicians. The book is heartily recommended as a reference text on the functions of the body.

CRIPPLED CHILDREN: THEIR TREATMENT AND ORTHOPEDIC NURSING. By Earl D. McBride, B. S., M. D., F. A. C. S., Assistant Professor of Orthopedic Surgery, University of Oklahoma School of Medicine, Oklahoma City. In collaboration with Winifred R. Sink, A. B., R. N., Educational Director, Grace Hospital School of Nursing, Detroit, Michigan. Second edition. Cloth. Price, $3.50. *Pp.* 379, *with* 195 *illustrations. St. Louis: C. V. Mosby Company,* 1937.

This is the second edition of this valuable book which is intended to supply those interested in the care and treatment of crippled children with such knowledge and information as the orthopedic surgeon would deem advantageous to have presented to them.

The first eight chapters are confined to the technic of orthopedic nursing—the ninth being devoted to physical therapy. The author apparently recognized that physical therapy is not a part of orthopedic nursing, for he states: "To become a trained physical therapy technician, a special course of study is required," but he continues, "there are many useful and very effective procedures especially in the use of water, light, muscle education and massage in which the orthopedic nurse should become efficient." There is a tendency for orthopedic nurses to attempt all kinds of physical therapy. Physical therapy technicians, after they graduate as nurses, spend a year's time studying further anatomy, physiology and pathology in order to become proficient in massage and exercise. Orthopedic nurses are not qualified in physical therapy and this should be emphasized. The duty of an orthopedic nurse, as the author states, is only "to cooperate with the physical therapist."

The value of the section on electricity in such a book is questionable. Surely an orthopedic nurse cannot be expected to use static electricity and diathermy. The statements in this section on electricity also are open to discussion; for instance, it is stated under static electricity: "It is also used in nervous disorders, general debility and as a general tonic stimulant."

There is a chapter on braces, and the remaining chapters are devoted to the diseases and injuries seen by the orthopedic surgeon and orthopedic nurse. It can be highly recommended to orthopedic nurses and to physical therapists working in orthopedic institutions.

THE CITADEL. By A. J. Cronin. Cloth. Price, $2.50. Pp. 401. Boston: Little, Brown and Company, 1937.

This book already has received considerable attention in lay and medical circles where it has achieved the reputation of a "best seller." Although it is a novel with fictitious characters, it reflects many real problems which confront the young doctor at the present time. Instead of dealing in platitudes, however, the author has divested the doctor of his cloak of idealism and has made him a human character, guilty of human frailties. The conflict arising from the natural desire to obtain material security, on the one hand, and the idealistic obedience to the highest principles of the Hippocratic creed, on the other, is the underlying theme of this human story.

"The Citadel" depicts the struggles of a young English physician, Doctor Andrew Manson, who begins his career as a contract physician in a small mining town. The author utilizes this situation to express his reactions against the panel system of medical practice. He depicts the inadequacy of this type of medical service in so straightforward a manner as to have aroused not a little concern and controversy among the medical profession.

As the story unfolds, Doctor Manson moves on to the "big city." Spurred on at first by idealistic purposes of research and the desire to become proficient in rendering service to mankind, he is confronted by the "red-tape" and politics of organized medicine. Disillusioned, he carelessly succumbs to the temptations of "society practice." In gaining wealth and position he loses much that he cherished, including his wife. In the end, however, he finds himself again and retraces his steps to take up anew the pursuit of a noble profession.

INCUNABULA IN THE HUNTINGTON LIBRARY. Compiled by Herman Ralph Mead. Cloth. Price, $7.50. Pp. 386. San Marino, California, 1937.

"Incunabula" are the first printed books. Printing was invented about 1450 and the books printed between this time and about 1500 are classed as incunabula. This library's collection of incunabula includes examples of printing at 156 places and 770 presses. This list contains 5,291 items. The arrangement, following the method devised by Robert Proctor of the British Museum, groups the books under their printers and places of printing. Full indexes of authors and titles, as well as the concordances of Hain, Copinger and Reichling, are given.

The above list includes 532 medical incunabula which Mr. Mead collected and published as a separate list in the Huntington Library Bulletin, May 1931. This list is of great value to those interested in medical history.

FEVER THERAPY: ABSTRACTS AND DISCUSSIONS OF PAPERS PRESENTED AT THE FIRST INTERNATIONAL CONFERENCE ON FEVER THERAPY, COLLEGE OF PHYSICIANS AND SURGEONS, COLUMBIA UNIVERSITY, NEW YORK CITY, MARCH 29, 30, 31, 1937. Cloth. Price, $5. Pp. 486. New York: Paul B. Hoeber, Inc., 1937.

The title on the cover of this book, "Fever Therapy—Simpson and Bierman," unfortunately is very misleading. One would infer that the volume was written jointly by Doctors Simpson and Bierman. On closer inspection, however, this is found not to be the case, for it is nothing but a collection of disappointingly brief abstracts of papers delivered before the First International Fever Conference held in New York, March 1937. The abstracts are printed in English, French and German, and one wonders whether it might not have been wiser to have published a more comprehensive report in English alone. This volume is of little value to anyone interested in fever therapy. No doubt the majority of these papers will be published in full in the current medical journals.

VOCATIONAL REHABILITATION OF THE TUBERCULOUS. By C. V. R. Bleecker, State Supervisor of Rehabilitation, New Jersey Rehabilitation Commission, Frederic G. Elton, District Supervisor, Rehabilitation Division, New York State Education Department, Edyth Ahrens, and Harry A. Pattison, M. D., Director, The Potts Memorial Hospital. Meeting Tuberculosis Sanatorium Conference of Metropolitan New York at Seton Hospital, Spuyten Duyvil, N. Y., Wednesday, September 22, 1937. Paper. Pp. 21. New York, 1937.

This pamphlet presents the papers given at the meeting of the Tuberculosis Sanatorium Conference of New York.